

McGraw-Hill makes the case for industrial modernization.

CW tells the why, what and how of modernization for CPI management ..... p. 55

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# Chemical Week

October 11, 1958

*Modernize now  
for growth and profits*

**PLAN**

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*Modernize now  
for growth and profits*

*Modernize now  
for growth and profits*

A SPECIAL REPORT FROM MCGRAW-HILL TO AMERICA'S BUSINESS EXECUTIVES

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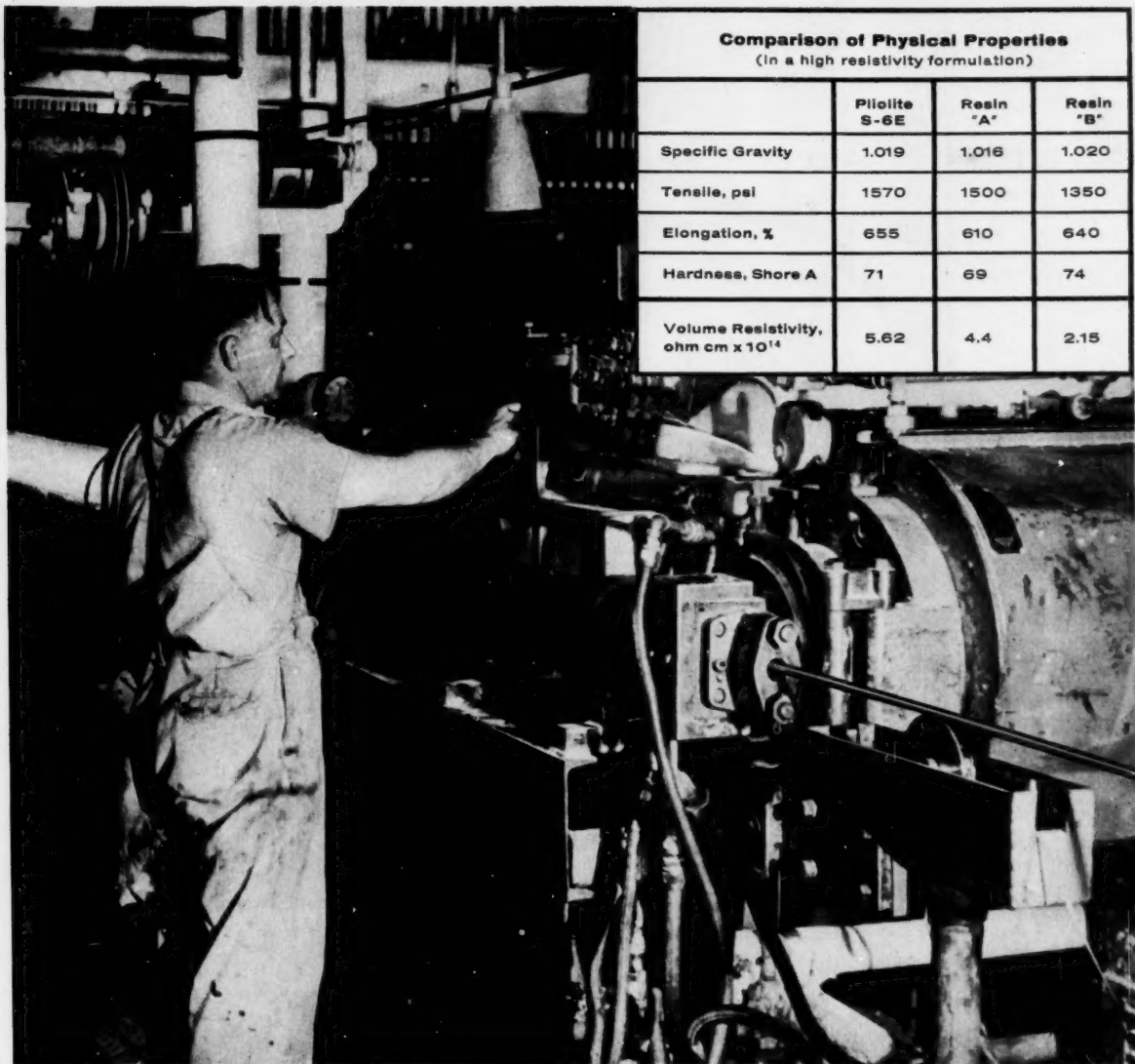
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Volume Resistivity, ohm cm x 10 <sup>14</sup>	5.62	4.4	2.15

Photo courtesy, The Okonite Company, Passaic, New Jersey

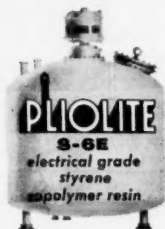
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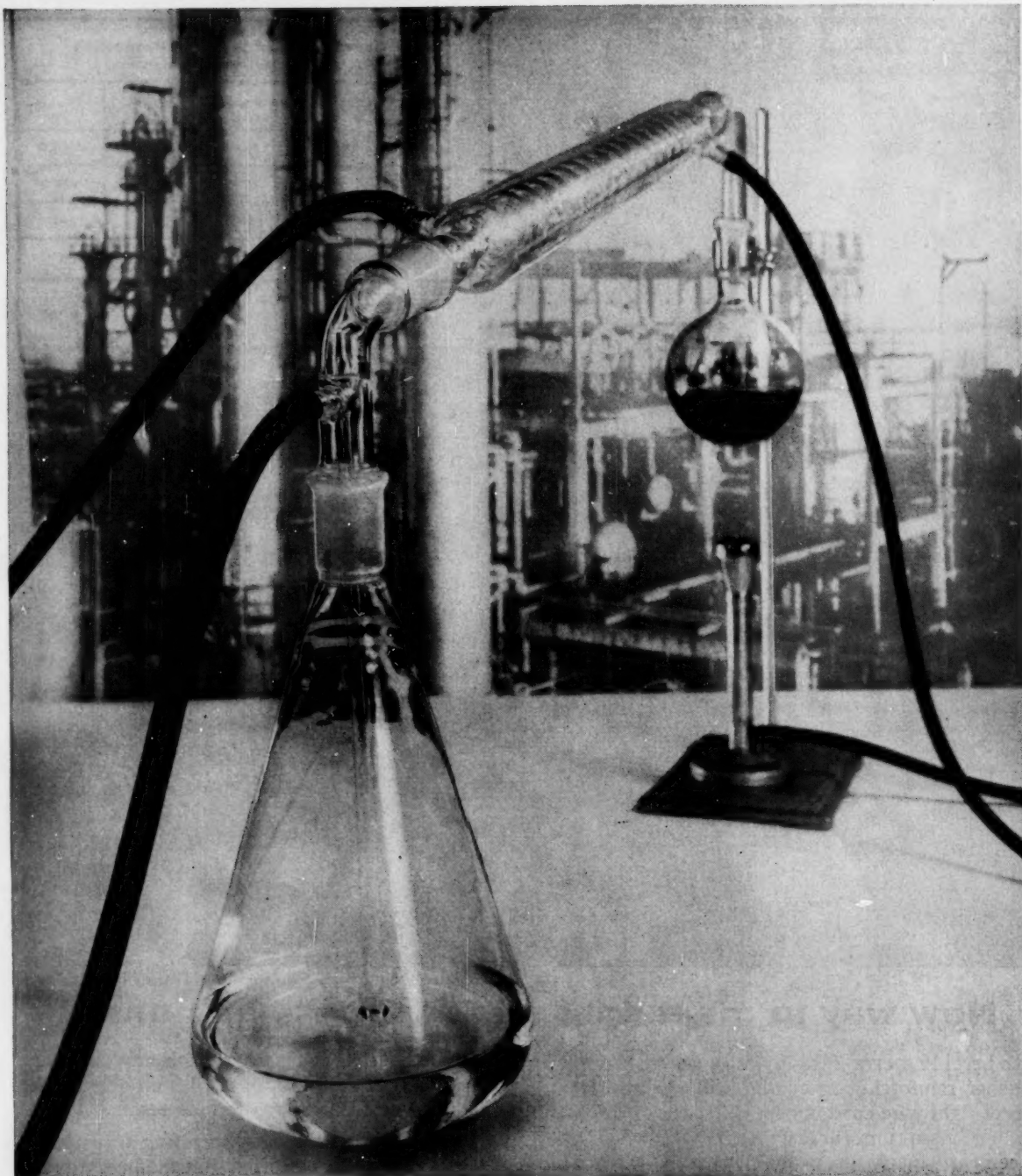


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# Chemical Week

TOP OF THE WEEK

OCTOBER 11, 1958

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- ▶ **How will they vote on "right to work" bills?** Here's what to expect from balloting in several important chemical states ...p. 37
- ▶ **Modernization—key to growth and profits** in the years ahead: 16-page special report gives facts for the CPI .....p. 55
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**28** Parke, Davis goes into high gear: 3-for-1 stock split, capital spending upped to \$55 million, various new products and possible acquisitions highlight growth program.

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COVER PHOTO—HANS BASKEN

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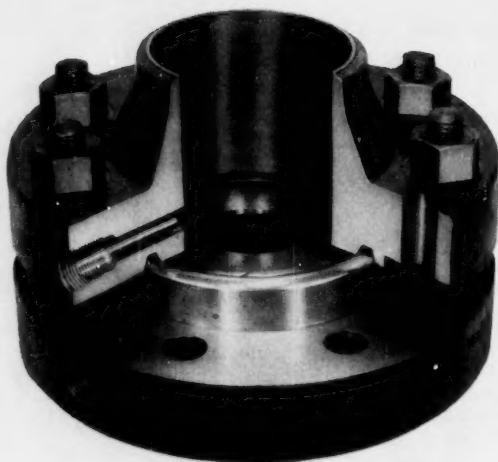
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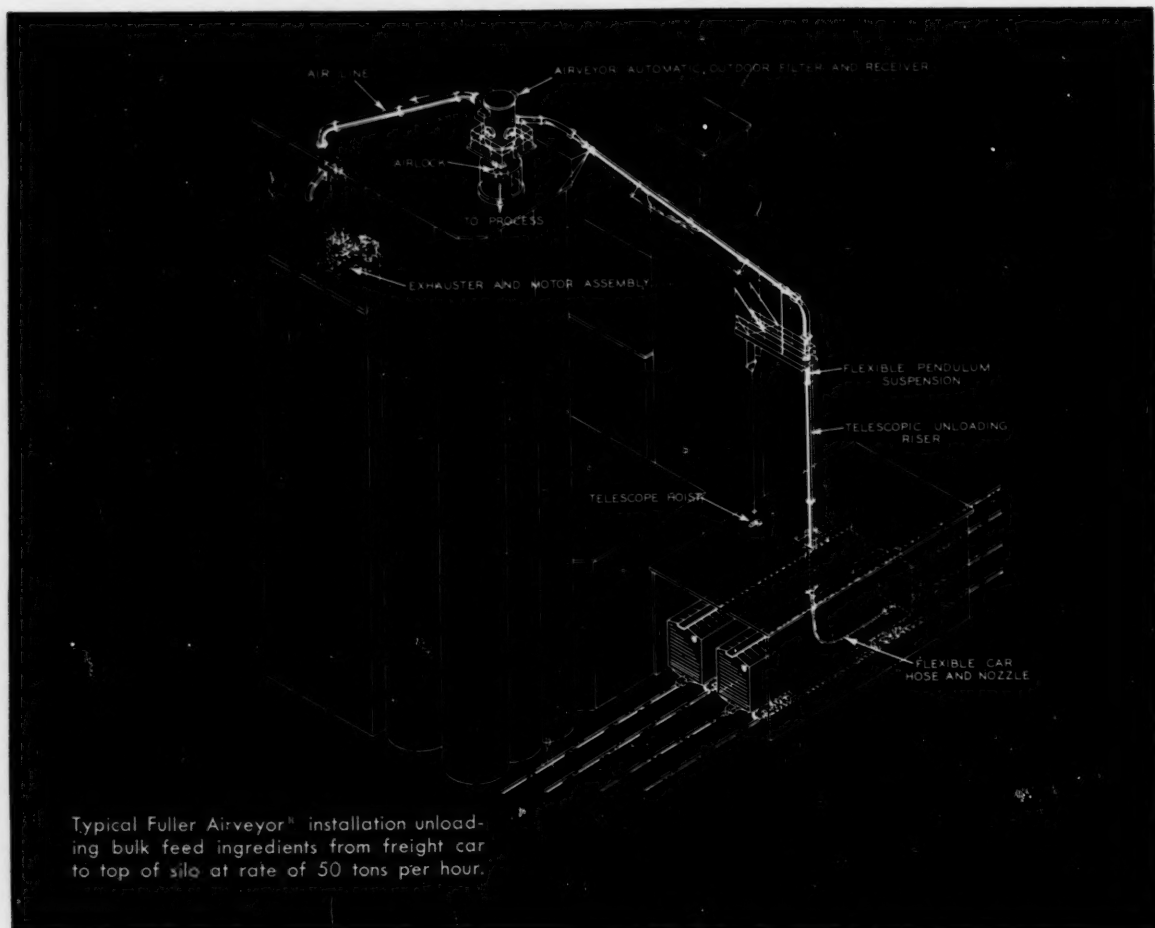
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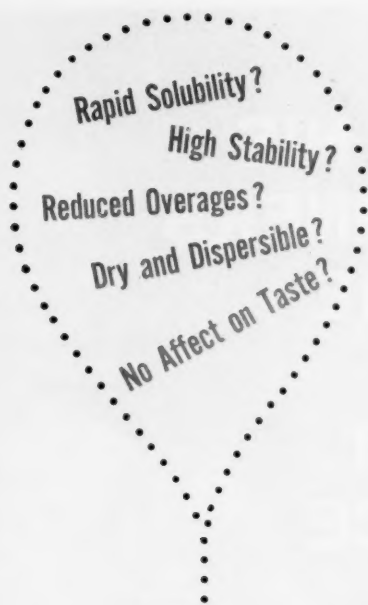
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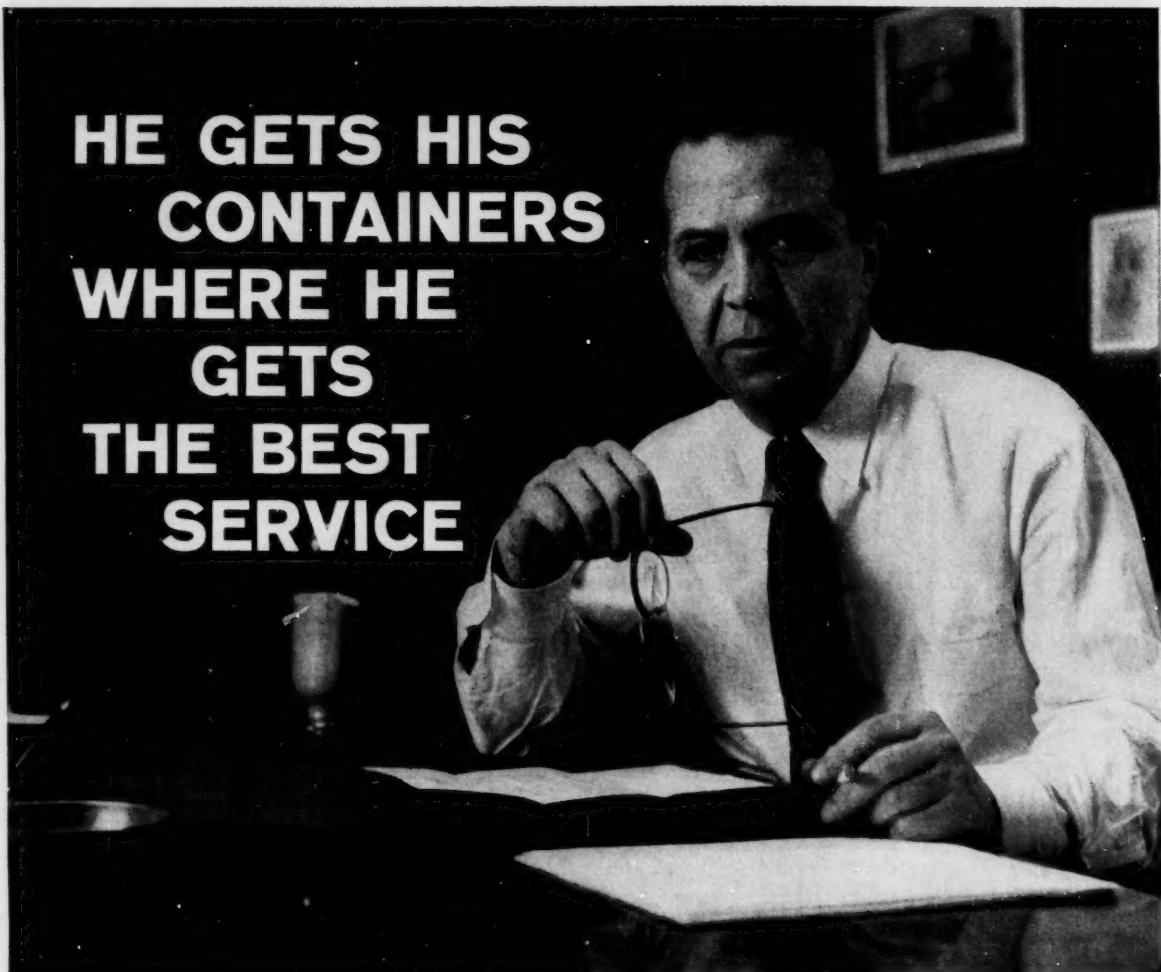


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## VIEWPOINT

**MODERNIZE NOW?**—with sales down, profits down even worse, and capacity standing idle? Ridiculous!

Such an attitude makes sense—on the surface. But a deeper look shows that for a variety of reasons industry can't afford not to modernize.


**CHEMICAL WEEK's** Special Report in this issue (p. 55) sets forth the factors to be considered, especially by the chemical process industries. Painting with a broader brush, the McGraw-Hill Dept. of Economics delineates (p. 51) the problem for all industry.

No company modernizes, of course, out of a sense of duty; it does so to make a profit. And one factor that merits further elaboration is the inevitability of rising labor costs during the decade of the '60s—an inevitability that stems from the old-fashioned economic law of supply and demand.

The fact is that while our population is gaining some 20 million during the 1955-65 decade, the number of people in the 25-44 age group will actually decline. The increasing proportion of youngsters and of people over 65 means that the working force—those 20-65 years old—will constitute a smaller proportion of the population for some time to come.

Therefore, the firm that has more productive tools than its competitors, and hence relies less on constantly higher-priced labor, will be in the most enviable position in the years ahead.

Recognizing this, as well as the many other circumstances arguing for modernization now, McGraw-Hill Publishing Co. is pushing "PLAN '59" through all 34 of its business and industrial magazines. The chemical process industries' facilities are newer than most, but, because of rapid technological change, they become obsolete sooner than most. Therefore, the problem is no less real for our industry than for others.

  
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...AMONG SOME

3700

ORGANICS

### Monkshood and delphinium

Striving to make conversation, we closed our eyes and opened "Eastman Organic Chemicals List No. 41." Our blind finger fell on Eastman 7381, 7-Ethyl-3,4-dihydro-1-(2H)-naphthaleneone, bottom of p. 106. That would do. We looked up the records, and off went a letter to S. W. Pelletier of the Rockefeller Institute for Medical Research inquiring to what purpose he had had us prepare this compound. His response came by return of post.

Monkshood is like a wild delphinium. Beware. In man, the lethal dose for the aconitine from its leaves and roots is 2 to 3 mg. In ancient times this extract was used for arrow poison and for relief of hypertension, gout, and rheumatism. Absorbed through the mucosa or skin, it produces intense tingling and warmth, then peripheral anesthesia. On the central nervous system its effect is stimulation of the medullary vagal centers and slowing of the heart rate. "Is that so?" was once the appropriate next question. Intellectual fashions change. Today the proper question is "Why?" You want to know the molecular machinery.

In the middle of 1957, Pelletier put a young post-doctorate to work synthesizing a certain  $C_{15}H_{15}N$  base which comprises all but six carbons of the atisine skeleton, one of the simpler aconitine alkaloid structures present in monkshood and delphinium. Duplication of the postulated molecule required a 14-step synthesis. Producing only 50 grams of the 4th step product took a week. Figuring the probable attrition in cul-de-sacs along the rest of the route, Pelletier wanted at least 500 grams at the end of that 4th step. Whereupon he thought of us. No strain here. Whereupon the 14-step synthesis shrank to a 10-step synthesis, with plenty of Eastman 7381 left over for others interested in monkshood and delphinium.

Dr. Pelletier can now unequivocally state [*J.A.C.S.*, 80, 2588 (1958)] that the  $C_{15}H_{15}N$  base is 1-methyl-6-ethyl-3-

azaphenanthrene. He also states, "I might add that the success of this work is due in no small measure to Eastman's supplying this material quickly and at a reasonable cost." Sounds good.

### A venture in soap

Picture a large plant where each day they manufacture  $10^9$  miles of a certain critical material, 42 inches wide. Cleanliness is the watchword, of course. On an average of once in five years, however, a piece of the product is found in the course of its final inspection to have a small spot on it. There is some value in fixing the guilt, even though merciful disposition of the matter by simply slitting the throat of the superintendent of the offending division is considered poor industrial relations.

The little spot probably originated as a tiny particle of lubricant from somebody's machinery. Whose?

Thanks to an idea from the teeming brain of a young man whose father-in-law always knew he'd make good, the question can be answered. Each division's lubricants are tagged with a little characteristic soap in which the metallic element is a scarce and heavy one. When the spot alarm sounds, a quick excision is made and a spectral finger points at the suspect.

We make the exotic soaps. A typical one is 2-ethylhexanoic acid indium salt. The light, branched-chain acid radical permits blending into almost any commercial lubricating oil or grease, with little effect on lubricating qualities at the level of 0.25%. We could make such soaps for anybody, from any element on the left side of the periodic table and from any reasonable acid he wants, including stearic.

This would be on the basis of our custom synthesis service, not as listed compounds like other Eastman Organic Chemicals. Let's keep it that way until a system of trace-coding for lubricants gets covered by international convention.

This isn't our first venture into soap.

We can remember back to when we ground sodium ricinoleate by hand for the toothpaste trade.

### Spectrography is nice, too

Is \$3 too much to ask for one gram of *Toluene-3,4-dithiol* (Eastman 4508)? We'll tell you why we ask.

In 1937, within a year after a British chemist announced that this compound is a reagent for tin and nicknamed it "dithiol," we tried to make some. Our luck was poor. Yield was 8%, and quality was dubious. We decided to forget about it.

Yet dithiol refused to lie down and die. Chemists have persisted in writing papers about it—"most promising colorimetric reagent for tin"; molybdenum determination in soils, metals, and rocks; simultaneous determination of molybdenum and tungsten in biological materials; the zinc-dithiol complex as a reagent for arsenic and germanium; determination of tin in foods, in malt beverages; semi-microanalysis for bismuth; and on and on. There was a market there, all right.

Once we came close to doing something about it. A paper in the Indian literature, though it discussed another compound, struck us as offering a sound route to dithiol. We talked ourselves out of trying it on the grounds that dithiol had a short shelf life.

Eight more years slipped by before the break came. An inquirer so goaded us with his scoffing at our pessimism about dithiol and with his taunt about what a cinch it was that we lost our head a little and bought the right to use his method. We don't react that way very often.

His method seems to have worked. We find ourselves in possession of a large stock bottle full of dithiol. Over the dithiol there is nitrogen, just to be surer. It is to be hoped that all who have inquired about dithiol over the past 21 years are still alive and well and interested in analytical chemistry.

Procedural abstracts on the more promising applications of dithiol are obtainable without charge from *Distillation Products Industries*, Eastman Organic Chemicals Department, Rochester 3, N. Y. Likewise obtainable is the new List No. 41 of some 3700 Eastman Organic Chemicals, of which, happily, dithiol is but one.



## Eastman Organic Chemicals

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**BALTIMORE & OHIO RAILROAD**

*Constantly doing things—better!*



## NEW PLURACOL TP TRIOLS AVAILABLE IN FIVE URETHANE GRADES

This news bulletin about Wyandotte Chemicals services, products, and their applications, is published to help keep you posted. Perhaps you will want to route these and subsequent facts to interested members of your organization. Additional information and trial quantities of Wyandotte products are available upon request . . . may we serve you?

If you've been following Wyandotte's exciting progress in the development of polyether starting materials for urethanes, this news will be of vital interest to you: Five urethane grades of Pluracol\* TP triols—specifically designed for incorporation in flexible, semi-rigid, and rigid urethane-foam formulations—are now available in commercial quantities.

Applications of these polypropylene glycol derivatives of trimethylolpropane break down like this: Pluracol TP-440 and TP-740 are utilized in rigid foams; Pluracol TP-1540 is used in flexible foams of low resilience; Pluracol TP-2540 and TP-4040 are important components in resilient, flexible foams. And there are more grades under development.

You can order Pluracol TP polyols in 5-, 15-, and 55-gallon drums in mixed carloads or truckloads; or in 4,000-, 8,000-, and 10,000-gallon tank cars. Current prices range from 25½¢ to 32¢ per pound in tank-car quantities.

Used by themselves or in combination with other polyethers, Pluracol TP triols promise many interesting results in flexible and rigid foams, in a wide range of densities and resilience . . . encompass application in materials for cushioning, impact absorption, isolating vibration, thermal and acoustical insulation, filling cavities, encapsulating awkward shapes.

Note this new trademark designation: Our Polypropylene Glycol 2000 (PPG 2000) will now be identified as Pluracol P-2010, urethane grade, for simplification in ordering. Pluracol P-2010, already widely accepted, produces flexible foams with low compression set, high tensile strength and tear resistance, high elongation and resiliency.

With the addition of the Pluracol TP series to our line of urethane-grade polyethers, customers may select from an even broader range of Wyandotte raw materials to obtain properties tailored to individual urethane requirements. Wyandotte's product line for the urethane industry includes: Pluronic\* L61, polyoxyalkylene glycol for resilient foams; Tetronic\* 701, polyoxyalkylene derivative of ethylene diamine used extensively with Pluracol P-2010 and Pluronic L61 for cross linking and imparting resiliency and load-bearing characteristics to urethane foams; Quadrol\*, an excellent cross-linking agent and catalyst (particularly for rigid foams); DHP-MP, an odorless catalyst for controlling foam reactions.

Literature and samples are available. Please send requests on your company letterhead. Address Dept. CO for prompt attention.

\*REG. U.S. PAT. OFF.

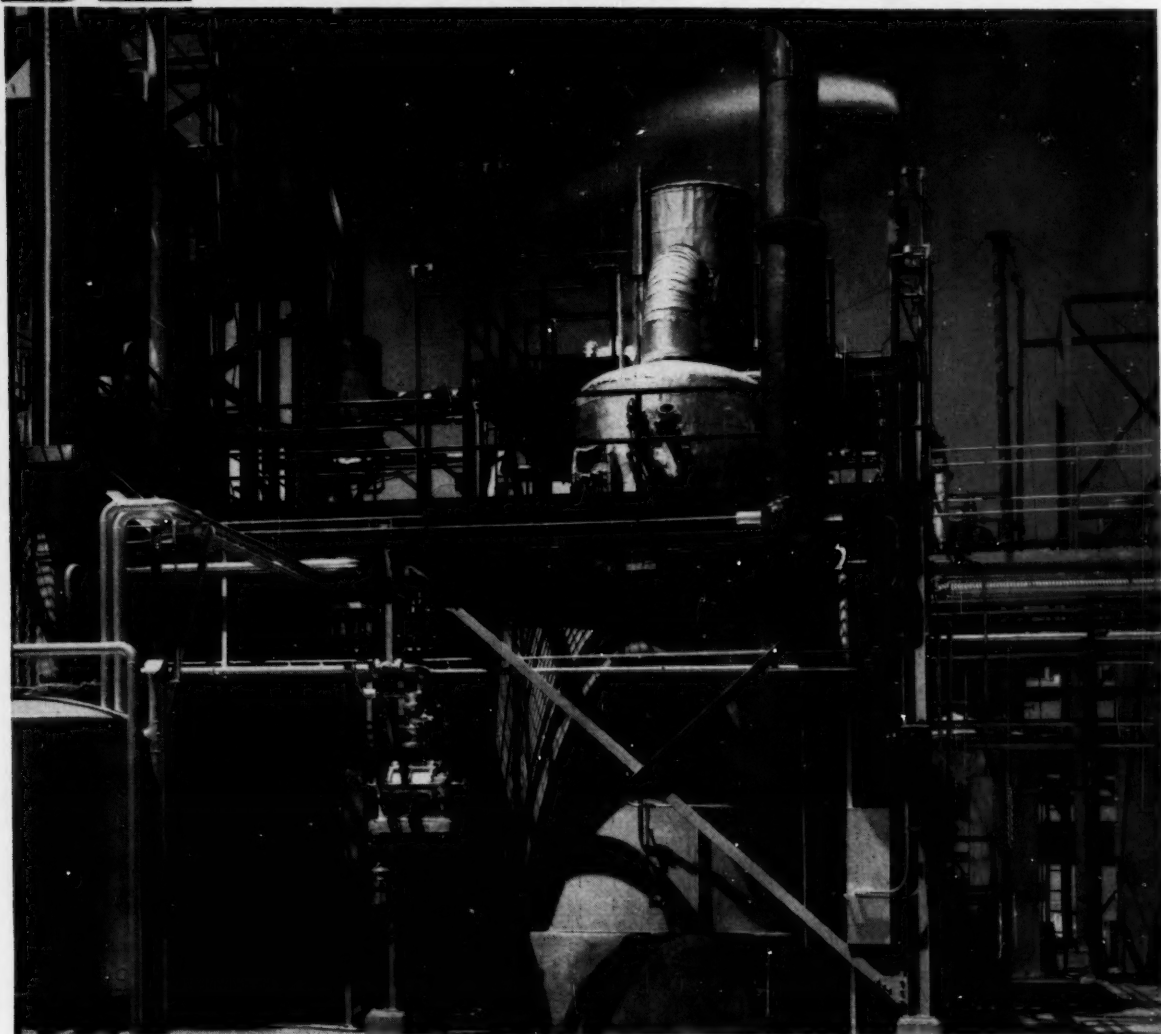
# Wyandotte CHEMICALS

WYANDOTTE CHEMICALS CORPORATION  
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*Blaw-Knox builds for HumKo, Division National Dairy Products Corp., a radiant heated batch fatty acid still. Supplementing a continuous still previously supplied by Blaw-Knox, this new unit increases HumKo's output of fatty acids and improves production efficiency.*



## Industry's first radiant furnace cuts fuel costs...tightens temperature control

*New economies for batch fatty acid distillation are introduced with the Blaw-Knox Radiant Furnace. Proven and popular in resin and plastic operations, this unique furnace brings the same design advantages to the fatty acids industry.*

The furnace features a light, stainless steel shell surrounded by light weight, high temperature insulating material. About 75 percent of the heat to the batch is supplied by radiation from furnace walls. This speeds heating and provides improved response to temperature control. Low heat retention and effective insulation cut heat losses, account for significant fuel savings. Reduced maintenance is an added bonus.

The radiant furnace is a pace setting product of a continuing process development program. *Experienced initiative* sparks all projects undertaken by Blaw-Knox's complete engineering and construction service.

When planning your next project—a new plant, or modernization, or expansion, contact Blaw-Knox Company, Chemical Plants Division. Headquarters in Pittsburgh. Branch offices in New York, Chicago, Haddon Heights, New Jersey, Birmingham, Washington, D.C., and San Francisco.

*for plants of distinction . . .*



# Using Salt Efficiently

by INTERNATIONAL SALT COMPANY, INC.



## How to Measure Brine Strength on Different Hydrometer Scales

The most common method of measuring brine strength in industry is to use some type of hydrometer. Every hydrometer sinks into a liquid until it has displaced a weight of the liquid equal to its own weight. The scale divisions on a hydrometer are not usually of equal length, since the volume of displaced liquid increases as more of the stem is immersed.

Using a hydrometer is a relatively simple process—but reading the hydrometer scale is complicated by this fact: the scale may vary from plant to plant because hydrometers may be used to measure strength of other liquids, as well as salt brine. To help clear up any possible confusion, here are an explanation and a comparison of the five most common hydrometer scales used for measuring brine strength.

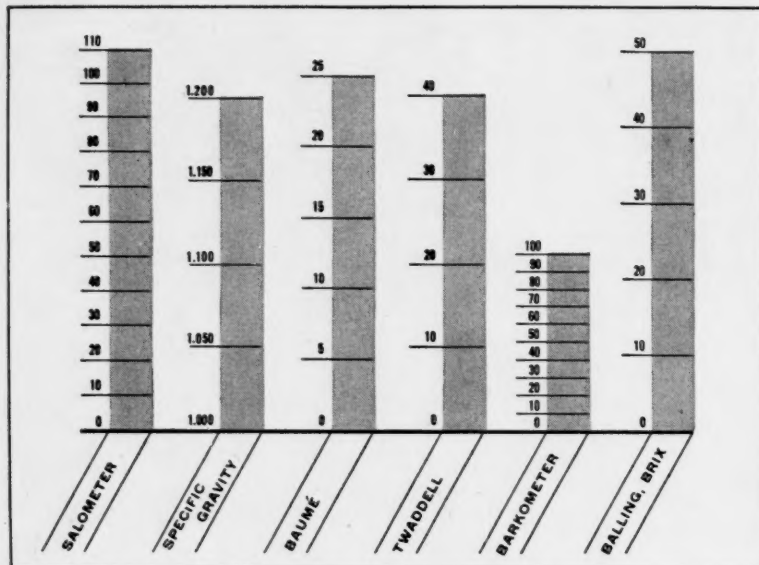
**SALOMETER SCALE.** This is by far the most common of all the hydrometer scales used for testing brines. The scale indicates directly the per cent saturation of the brine, reading 0° S. in pure water, and 100° S. in fully saturated brine. The salometer uses the values of Gerlach, meaning that 100%-saturated brine contains 26.395% salt by weight. Each salometer degree, then, represents 0.2639% salt.

The salometer reading expresses the per cent of saturation. Thus, a brine of 40° S. strength is 40% saturated, and contains 40% of 26.395%, or 10.558% salt by weight.

**SPECIFIC GRAVITY SCALE.** This reads the specific gravity of the brine *directly*. These hydrometers may be obtained with the entire length of scale covering a limited range of specific gravities, thus permitting great accuracy.

**BAUMÉ SCALE.** This scale was originally intended to have each degree equal a per cent of salt in the brine. But this is now only a rough approximation. The Baumé scale reads 0° Bé. in pure water, 24.6° Bé. in fully saturated brine. Also, a factor of "modulus" is needed to translate degrees Bé. to specific gravity, since the scale divisions are of equal length. This modulus has been standardized at 145, so that degrees Bé.=145/sp.gr.

**TWADDELL SCALE.** Named after its inventor, the Twaddell scale reads 0° Tw. in pure water, 40.8° Tw. in fully saturated brine. Each increase of 0.005 in specific gravity causes 1° increase on the Twaddell scale. Thus, the



COMPARISON OF COMMON HYDROMETER SCALES

(Chart gives quick, visual relationships of readings on the salometer scale to readings on other scales.)

number on the right of the decimal point of the specific gravity, divided by 5, is the degrees Tw. For example: 1.140 sp.gr. is 140/5, or 28° Tw.

**BARKOMETER SCALE.** Used extensively for testing tanning liquors, the Barkometer scale reads 0° Bk. in distilled water, and 204° Bk. in fully saturated brine. Each increase of 0.001 in specific gravity causes 1° increase on the Barkometer scale. Thus, the number on the right of the decimal point of the specific gravity is the degree Bk. For example, 1.025 sp.gr. is 25° Bk.

The hydrometer scales described above are usually calibrated for brines at 60°F. temperature. When testing brines at other temperatures, it's necessary to make certain corrections...or to use a specially designed hydrometer. You can get a table

showing proper temperature corrections, plus other data on measuring brine strength, from International Salt Company.

Using salt in its many industrial applications calls for technical knowledge and experience. International Salt Company has both—plus a continuing program of research and development in salt. These things can be put to work for you... in your plant... to help you get the most out of the salt or brine you use.

### INTERNATIONAL SALT CO., SCRANTON, PA.

Sales Offices: Atlanta, Ga.; Chicago, Ill.; New Orleans, La.; Baltimore, Md.; Boston, Mass.; Detroit, Mich.; St. Louis, Mo.; Newark, N. J.; Buffalo, N. Y.; New York, N. Y.; Cincinnati, O.; Cleveland, O.; Philadelphia, Pa.; Pittsburgh, Pa.; Memphis, Tenn.; and Richmond, Va.

Service and research  
are the extras in

## STERLING SALT

PRODUCT OF INTERNATIONAL SALT COMPANY, INC.





## this much DAP. . . .

It doesn't take much Victor diammonium phosphate—combined with certain resins—to flameproof building materials . . . and keep this crew of smoke-eaters cool, calm, and kibitzing.

In addition to flameproofing wood and insulating materials, Victor ammonium phosphates (both di- and mono-) help form flame-resistant coatings for interior wallboard, serve as an ingredient in flame-resistant paints, make papers and textiles flame-resistant.

Perhaps you have a hot problem with one of *your* products. If it's flammable, a Victor flameproofing chemical may make it more marketable. Why not sound the alarm for a sample? We'll have one fired your way before you can say, "It pays to see Victor." Write on your company letterhead to: Victor Chemical Works, Box 572, Chicago 90.

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Dependable Name in  
*Chemicals*  
for 80 Years





## this much Questex®

It takes just a trace of Victor Questex (EDTA, Ethylenediamine tetra-acetic acid)—in combination with other ingredients—to produce rubber for tires that will be stronger, more heat-resistant . . . ready to hit the road for long hours at a time.

Rubber manufacturers know they're on solid ground when they use Victor Questex—the versatile chelating agent that controls metallic ions in rubber recipes, permits faster polymerization at lower temperatures, and makes a lighter colored product which is stabilized against trace metal catalyzed oxidation.

If *your* quest is for a chemical to help control metallic impurities in your processes, Questex may be exactly what you're looking for. Send for a sample and find out if this chelant is the key to your problem. We'll dig right in and have a sample on your desk before you can say, "It pays to see Victor."

Write on your company letterhead to:

Victor Chemical Works, Box 572, Chicago 90.



## OPINION

### Educational Idea

TO THE EDITOR: . . . In reading "Showing Industry's Stake in Education" (Sept. 20), I obtained an idea that I hope we can use in Delaware. . . . I am sure that such articles do a lot of good.

GEORGE R. SEIDEL  
Technical and Educational Adviser  
E. I. du Pont de Nemours & Co.  
Wilmington, Del.

### Cohoe, Not Leonard

TO THE EDITOR: Is it possible that my eyes have gone "berserk"? It may well be. But, I'll wager one of our excellent \$2.65 luncheons against a thin dime that Past President Julian Leonard, whom you show on page 23 of your Sept. 27 issue, does not have a double. It is our own Past President (Chemists' Club) Dr. Wallace Cohoe.

HOWARD FARKAS  
President  
The Chemists' Club  
New York

*Reader Farkas already has the dime.—ED.*

### Comments on Co-ops

TO THE EDITOR: . . . [Re your story (May 17)] there is no law, and I hope there never will be one, which curtails the freedom of individuals (including farmers) and prohibits them from doing things for themselves. Therefore, if farmers put up the capital, hire the management and operate any businesses within the laws of this government, they are entitled to any benefits they can receive from these businesses. . . .

GEORGE G. CONNOR  
Executive Vice-President  
and General Manager  
Pennsylvania Farm Bureau  
Cooperative Assn.  
Harrisburg, Pa.

TO THE EDITOR: . . . We are a co-operative organization, owned by large, progressive and successful farmers of this area; and quite contrary to your concept of co-operatives, we are not price-cutters nor are we exempt from federal income taxes. I believe that you would do well to check these facts in relation to farm co-operatives before embarking upon any further efforts to alienate the producers of

agricultural products and the chemical industry. . . .

TOM C. JONES  
General Manager  
Southern Farm Supply Assn.  
Amarillo, Tex.

TO THE EDITOR: . . . I can fully understand why any individual or group of individuals who have invested in a processing plant or an operation to handle farm commodities would have a violent reaction when farmers decided they wanted to carry on that operation for themselves. In a situation of that kind it has seemed to me that in fairness to the people who set up these operations, if the farmer wanted to take these operations back into his hands as he formerly had them, he should make every effort to protect the person or group of people who made the investment by making a purchase of their facilities rather than putting up new facilities and causing the person who made the investment to have a severe loss. . . .

D. W. BROOKS  
General Manager  
The Cotton Producers Assn.  
Atlanta, Ga.

TO THE EDITOR: . . . Farmers are the principal, almost the sole, users of fertilizer. There is no reason, therefore, no valid reason at all, why they shouldn't make their own fertilizer through their cooperatives if they find it advantageous to do so. . . .

HOWARD A. COWDEN  
Consumers Cooperative Assn.  
Kansas City, Mo.

## MEETINGS

**Packaging Institute**, 20th annual forum. Edgewater Beach Hotel, Chicago, Oct. 13-15.

**American Institute of Consulting Engineers**, annual dinner, Waldorf-Astoria Hotel, New York, Oct. 14.

**Institute of Management Sciences**, fifth annual international meeting; theme: science in management, modern tools for today's executive; Sheraton Hotel, Philadelphia. Oct. 16-18.

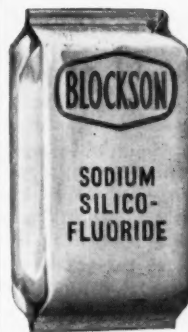
**Salesmen's Assn. of the American Chemical Industry**, annual sales clinic. Roosevelt Hotel, New York, Oct. 20.

**Instrument Society of America**, national rubber and plastics instrumentation symposium, Akron, O., Oct. 20-21.

**Blockson has  
the stand-by  
capacity to  
stand by its  
SODIUM  
SILICO-  
FLUORIDE  
customers**

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The largest Sodium Silicofluoride manufacturer, Blockson has stand-by capacity PLUS a plant expansion program that builds well ahead of its customers' increasing needs.



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P.S. Include SSF with other Blockson chemicals in your mixed-car orders.



**BLOCKSON CHEMICAL COMPANY**  
Division of Olin Mathieson  
Chemical Corporation  
Joliet, Illinois



M & C test fence adjoining Garden State Parkway at Menlo Park, N. J.

**\*Outside House Paints** — no streaking from wire screening with ASP extender pigments in formulation

M & C Research conducts continuous fence-testing of ASP's—aluminum silicate pigments—in outside house paint formulations. In a current project at McIntyre, Ga. and Menlo Park, N.J., test panels of southern yellow pine and western red cedar are in exposure with copper and galvanized wire screening nailed to the painted surfaces. After one year's exposure, panels with ASP extender pigments showed no streaking or staining. The whites, reds, greens and grays are all showing excellent color conformity. A six-year program of testing proved the superior weatherability, hiding, and stability of ASP-extended paints. It's the virtual chemical inertness and uniform particle size of these water-washed ASP's which make such performance possible. In addition, paint manufacturers find that ASP's ease of dispersibility gives fast wet-out. Get the story on M & C's aluminum silicate pigments. This is a *starred* item. Use the coupon.

**Adhesives Makers and Users: Bond Rupture Tack Test†** proves fast tack development for adhesives containing ASP's

Photos show the extent of fiber pull obtained in rupture of adhesive bond—visual proof of the superior tack-time characteristic of adhesives modified with M & C's aluminum silicate pigments. This test is another of the M & C-developed evaluation tools for building into *your* adhesives fast tack and other "process-engineered" values, including

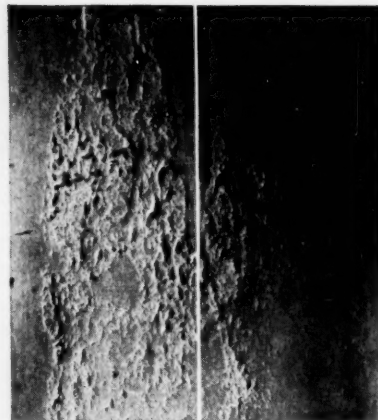
positive penetration control application flow adjustment  
bond strength improvement

... and all at higher machine speeds. Check the coupon for helpful *facts* to improve *your* gluing operations.

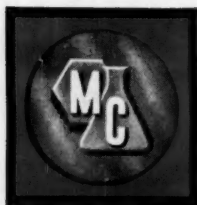
†TEST: Adhesive is spread 1 mil thick on standard chipboard by use of a Boston-Bradley Drawdown Blade. Another section of chipboard is placed over film immediately and pressure applied—from 10 seconds to 3 minutes in individual tests—then the two sheets are pulled apart by hand, rupturing the adhesive bond along the longitudinal axis of the adhesive film.

with  
ASP 400

without  
ASP 400



20 Seconds Under Contact Pressure



**MINERALS &**

CORPORATION OF AMERICA

*Leaders in creative use of non-metallic minerals*



## \*98+% Removal of Sulfuric Acid Alkylation By-products achieved with POROCEL adsorbent

Conventional caustic wash systems remove only about 65% of the acid and ester by-products from the effluent of sulfuric acid alkylation in petroleum processing. POROCEL preferential adsorption is carried out in parallel treating towers—one onstream, the other in regeneration—to deliver a clean, stable alkylate. The greater than 98% removal of sulfur from the alkylate brings benefits from virtual elimination of corrosion in fractionating tower and reboiler, improved lead susceptibility, and reduction in use of inhibitors. POROCEL has excellent cycle life, long process life. The family of POROCELS—activated granular bauxites of high surface area—works to upgrade quality and to cut petroleum processing costs in many additional jobs, including

adsorbents for color, odor, taste, and moisture  
catalysts for reforming, recovery of elemental sulfur, desulfurizing  
catalyst carriers for other active catalysts

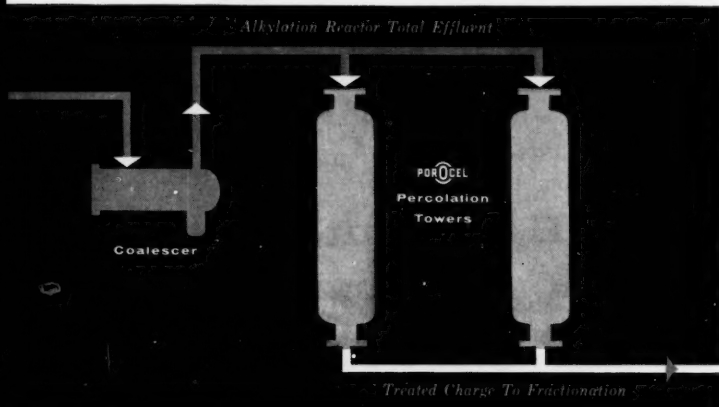
Look to the POROCELS to solve your problems in these areas . . . this is a starred item . . . use the coupon.



**Limestone Products**—pure and uniform—for steel making, chemical processing, construction, and agriculture

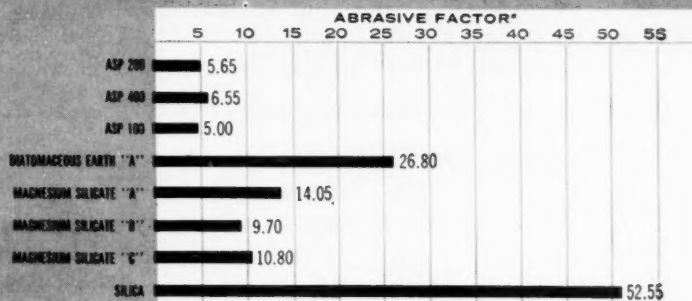
From quarries at Marblehead, Ohio; Presque Isle, Michigan; and Strasburg, Virginia; Chemstone Corporation\*\* supplies premium quality limestone products: FLUXSTONE metallurgical grade limestone, CHEMSTONE SRS (secondary road stone), RMC (ready-mix concrete aggregate) grades for construction, and MARBLEHEAD ground limestone and meal for agriculture. All of these products are processed from some of the country's highest calcium deposits for purity, hardness, size uniformity, low sulfur, and solubility as specified for their particular uses. These products can work for you . . . get information . . . use the coupon.

\*\*A subsidiary of M & C



## Ink Makers turn to ASP extenders for best grinding and printing behavior

Chart shows results of an abrasion test (details on request). As shown, low-abrasion ASP's promote high grinding speeds, low machine wear, superb "softness" and finish for the printer. ASP's offer half a dozen more pluses, too . . . one of which is low cost.



\*Loss in mg in excess of 4.45 mg Machine Constant

Use this quick two-check coupon ▶

- ✓ your product interest . . .
- ✓ what you need to get tests started . . .
- we'll fill your requests immediately.

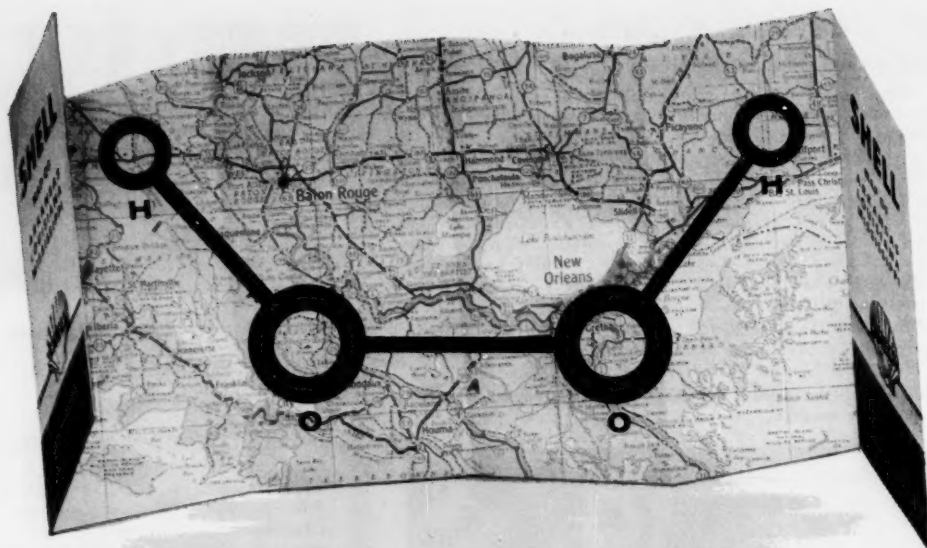
For more data, see your Chemical Materials Catalog, Pages 358-362

# CHEMICALS

6746 Essex Turnpike, Menlo Park, New Jersey

Export Department: Room 150, Garden State Parkway,  
Menlo Park, N.J. (Cable Address: "MINCHEM")

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- 6746 Essex Turnpike, Menlo Park, N. J.
- I'm interested in:
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- ☐ Ink Makers Extender
- Please send, without obligation:
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- name \_\_\_\_\_
- title \_\_\_\_\_
- company \_\_\_\_\_
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- city \_\_\_\_\_ zone \_\_\_\_\_ state \_\_\_\_\_

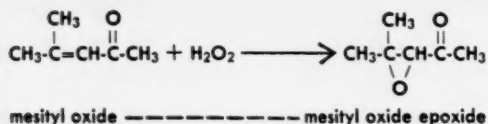


## Have you tried the $\text{H}_2\text{O}_2$ route to epoxidation, hydroxylation, peroxidation?

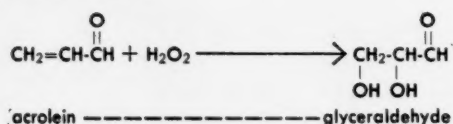
CHEMISTS HAVE KNOWN for a long time that hydrogen peroxide is a practical source of reactive oxygen. Recently, its uses have expanded into new fields.

Epoxidation, hydroxylation, and peroxidation reactions, using  $\text{H}_2\text{O}_2$ , have been studied several years by Shell. Here are three examples of these routes to new products using hydrogen peroxide.

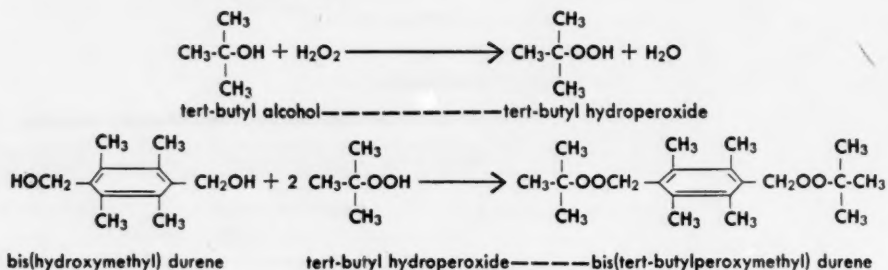
### Epoxidation:



### Hydroxylation:



### Peroxidation:



Shell Chemical's laboratory facilities and field staff are at your disposal to help you with problems in storage, handling and use of hydrogen peroxide. Write or phone your nearest district office listed below.

## SHELL CHEMICAL CORPORATION

### CHEMICAL SALES DIVISION

ATLANTA JACKSON 5-7621	BOSTON LIBERTY 2-9540	CHICAGO HARRISON 7-7292	CLEVELAND TOWER 1-8096-8097	DETROIT WOODWARD 1-4266	HOUSTON CAPITAL 2-1181
LOS ANGELES MADISON 5-7341	NEWARK MITCHELL 3-1100	NEW YORK OXFORD 7-3311	ST. LOUIS CHESTNUT 1-7420	SAN FRANCISCO EXBROOK 2-5400	



# Business Newsletter

CHEMICAL WEEK  
October 11, 1958

## Third- and fourth-quarter earnings predictions are bullish this week.

- Minnesota Mining & Mfg. Executive Vice-President Louis Weyand estimates third-quarter sales will hit \$95 million, 2.5% above the third quarter of '57. Moreover, Weyand predicts further gains in the fourth quarter will nudge year-end sales "slightly above those of '57."

- Food Machinery and Chemical President Paul Davies also appeared optimistic last week. Referring to substantial gains in July and August, he predicted FMC business in the second half will equal or exceed that of last year.

- Though Hooker Chemical Corp.'s nine-month earnings were 3.2% below '57's, the company reports a pickup during the third quarter, when net income hit \$2.5 million, 3.2% higher than last year. R. Lindley Murray, chairman, and Thomas Moffitt, president, said the "pickup in activity of the industries we serve will continue through the fourth quarter and into '59."

- Somewhat less enthusiastic is The Glidden Co., which posted earnings of \$6.1 million for its fiscal year ending Aug. 31, down 16.5%. However, the company attributes part of the loss to \$1.25 million charged against pretax income to cover the cost of abandoning its titanium pigment plant in Baltimore.

- National Lead Co. executives report that third-quarter results will be under '57's, but that an upward trend is developing. Vice-President A. H. Drewes says third-quarter sales "will at least equal and probably be ahead of" each of '58's first two quarters.

## Similar optimism prevails in the paper industry.

- D. J. Hardenbrook, Union Bag-Camp Paper Corp. vice-president, reports volume since June has been rising and that momentum has been gaining "very satisfactorily." Hardenbrook said that Union Bag-Camp will run both its mills at full capacity during the rest of '58.

• Two of this week's U. S. expansion projects are being launched by branches of Standard Oil of California.

- California Spray-Chemical Corp. (Richmond, Calif.) — a wholly owned Cal Standard subsidiary—plans to construct a \$4.6-million chemical fertilizer plant at Kennewick, Wash. Cal-Spray President A. W. Mohr says this plant, to be completed by Dec. '59, will produce ammonium nitrate solids, solutions and high-analysis nitrogen-phosphorus complex plant foods.

- And Cal Standard's Western Operations, Inc., is going ahead with two big refinery projects. Next week, this subsidiary will break

## **Business Newsletter**

(Continued)

ground for a \$40-million, 2,000-bbls./day refinery at Barber's Point, Hawaii; last week, it gave The Fluor Corp. a contract to construct the alkylation and isomerization units of the \$34-million facility to be completed next spring at Richmond, Calif.

•  
**At Houston, Tex., Reichhold Chemicals, Inc.** (White Plains, N.Y.), will build a \$1-million synthetic resins plant on a 20-acre site on the Greens Bayou Waterway. Scheduled for completion by next summer, this plant will turn out RCI alkyd, polyester and emulsion resins for use in the paint, aircraft, petroleum, boat and housing industries.

•  
**Fire at Esso's big refinery in Baton Rouge, La.,** has caused repercussions among chemical companies that use ethylene for processing in that area. Esso is operating an older ethylene unit, doesn't say how soon the new, high-purity plant will be back onstream.

Esso's ethylene customers are scrambling to protect their markets. All have promised no interruption in deliveries. Grace Chemical is hoping Esso's 40-60 days' underground supply will cover Grace's polyethylene plant needs until the new unit is repaired.

Wyandotte (ethylene oxide, glycol) will reduce operations at Geismar, shift production to the plant at Wyandotte, Mich., and buy end-products from outside sources to help fill orders. Ethyl Corp. (tetraethyl lead) and Foster Grant (styrene) will both make do with lower purity ethylene from Esso's older unit, foresee no major problems.

•  
**Foreign petrochemical developments abound this week.**

• In Austria, an 11-million-lbs./year polypropylene plant will be put up by the newly formed Danubia Petrochemie AG. Owners: Montecatini and the Austrian government-owned Stickstoffwerke AG. Each owns 40%. The remaining 20% will be sold to small private investors. Raw materials will come from Italy until an Austrian refinery is built near the plastics plant at Schwechat (near Vienna). Eventually, Austrian oil production is expected to exceed 3 million tons/year.

• In Japan, construction of the Asahi-Dow Ltd. styrene monomer plant is moving ahead of schedule. It's now expected onstream late in '59. Output will go into polystyrene, synthetic rubber.

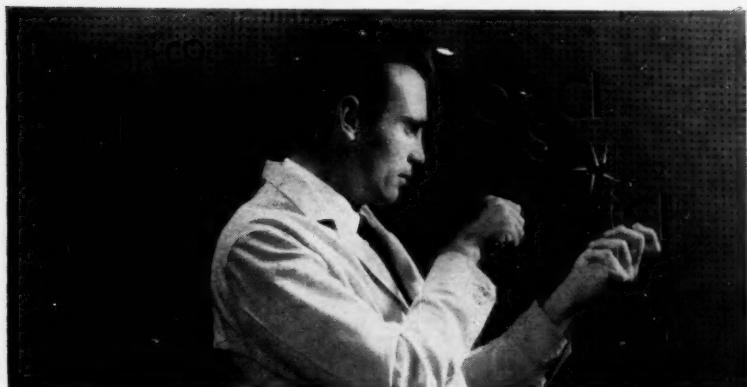
• In England, a new polyurethane synthetic rubber venture has been launched by three partners: the English companies, Camp Bird Industries and Knight Lickard & Co.; and the German firm, Lemforder Metallwarengesellschaft GmbH. Ownership is split equally.

• Michigan Chemical Corp. employees ended a two-week strike late last week. The new three-year contract calls for more managerial leeway in determining job content, plus a 5¢ hourly pay rise each year.



# BRIEFS

on chlorination and sulfonation...  
what to look for in muriatic specs...  
a free booklet on trichlorethylene



## Selective chlorination and sulfonation

It's easy to do some profitable processing tricks with Hooker sulfuryl chloride.

A simple change in temperature or in catalysts or in the proportion of reactants you use can have profound effects on the end product.

React sulfuryl chloride with the sodium salts of organic acids, for example, and you can vary the process to produce either the acid chlorides or anhydrides.

You can use sulfuryl chloride to chlorinate and sulfonate both the aromatic compounds and the aliphatic hydrocarbons and their derivatives.

What else recommends our product? It's 99% pure. It gives off much less heat during chlorination than elemental chlorine. You need relatively simple and inexpensive equipment to work with it. It has no flash or fire point.

For the rest of the story, we suggest you send the coupon for a technical data sheet and copies of Bulletin 330, *Sulfuryl Chloride in Organic Chemistry*, and Bulletin 328A, *Chlorinating Agents*. This last also gives information on our other chlorinating agents, chlorine, sulfur chlorides, thionyl chloride, muriatic acid, etc.

little higher level on these impurities. Hooker Commercial Grade offers these maximum specs: Iron: a low 0.0005%. Sulfates: 0.003%. Free chlorine: a slight trace. Arsenic: none.

Both grades come in rubber-lined tank cars. Both come in three strengths: 18°, 20°, and 22° Baumé. For more technical data, check coupon.

## Free booklet on trichlorethylene

Here, in forty pages, is a wealth of material on trichlorethylene. Includes physical and chemical properties, shipping containers, handling methods, etc.

It gives complete data on all three grades of Nialk® trichlorethylene which are of interest to chemical processors:

**Technical Grade** Maximum acidity as HCl is 0.0005%. Alkalinity as NaOH is 0.001% at the most. This grade boils at 86.6 to 87.8°C under atmospheric pressure. On evaporation at 100°C the maximum residue is 0.005%.



**Technical grade** is often used as a freezing point depressant, particularly in carbon tetrachloride fire extinguishers and as a solvent in various adhesive formulations.

**Extraction Grade** No HCl acidity. NaOH alkalinity runs from 0.006 to 0.008%. This grade will boil between 86.6 and 87.4°C under atmospheric pressure. Used mostly for extracting fats from animal matter, and oil from raw wool, cottonseed, and flaxseed.

**X-1 Special Grade** This grade was developed especially for processes calling for an unusually pure product.

To get the booklet check Bulletin No. 44 on the coupon. For a résumé of important facts check Trichlorethylene on the coupon.



## What to look for in muriatic acid specs

This white gummy substance is an insoluble precipitate which can form in certain reactions with muriatic acid that contains too much sulfate.

Iron, arsenic, and free chlorine can also give a process indigestion when their level in a muriatic acid is too high.

So it pays to consider these carefully when you examine any muriatic's specs.

Take Hooker White Grade muriatic, for example. Iron: a mere 0.0001% at the most. Sulfates: less than 0.003%. Free chlorine: none. Arsenic: none.

Very often your process can stand a

For more information, check coupon and mail with your name, title, and company address.

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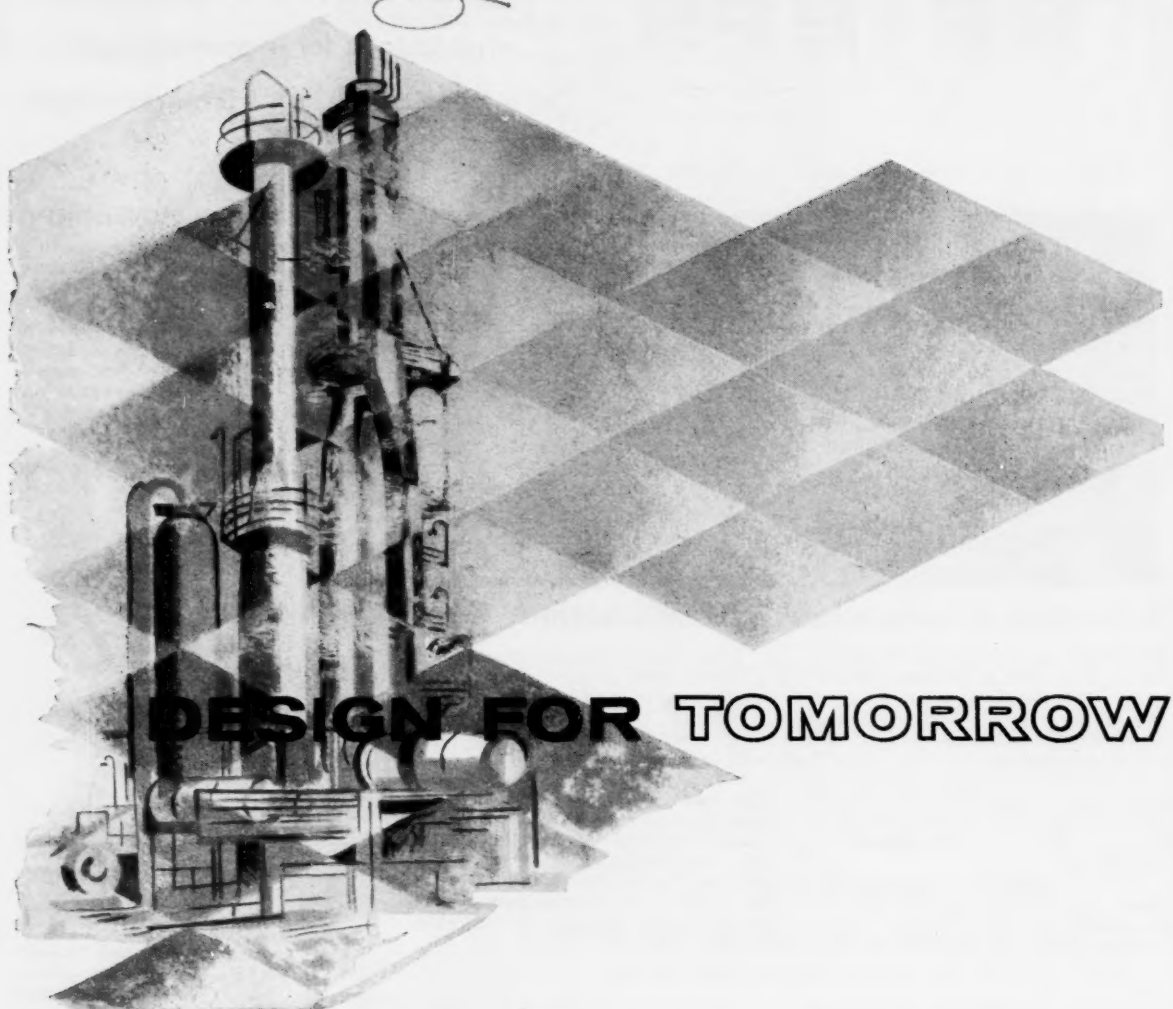
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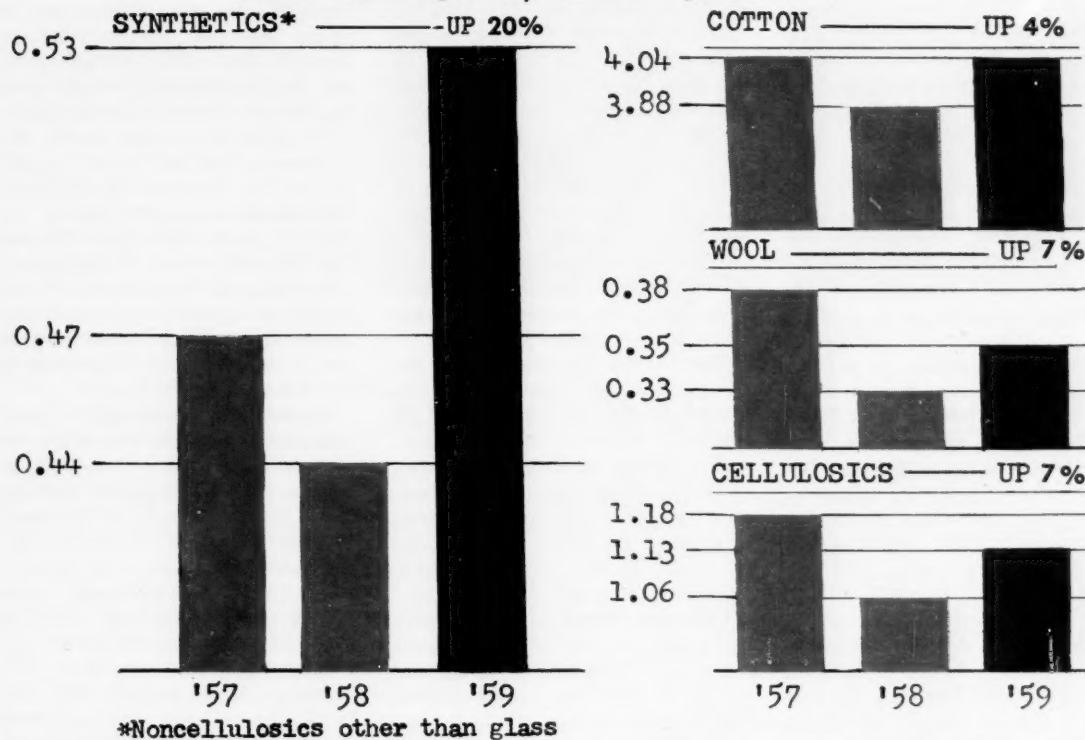
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## Synthetics: Big Gainer in '59

Percentages are gain for '59 over '58  
 (mill consumption, billion pounds)



## Synthetics Groom for Rapid Recovery in '59

At a Senate Commerce Committee hearing in Providence, R.I., last week, the long-suffering textile industry delivered a fervent plea for more protection against the mounting tide of imports. Once again, the sorry economic plight of the industry occupied the national stage. But while the textile industry in general still sings the blues, synthetic fibers makers are optimistic.

Du Pont economist W. A. Shaw underscored this contrasting outlook in a speech before American Marketing Assn. in Cleveland last fortnight.

The over-all textile advances of 5%-plus [next year], compared with those of '58," he said, "will reflect markedly different rates of re-

covery among the four major fiber groups." A 20% rise in domestic mill consumption of noncellulosics is what Shaw sees for next year (chart, above).

While Shaw's figures show that synthetics will account for only a small share of total fiber consumption—530 million lbs. out of about 6 billion lbs.—a long-range prediction pegs synthetic fiber output in '75 at 2 billion lbs. (CW, March 8, p. 96).

**Captious Capacity?** The question remains, however, whether synthetic makers are being too optimistic too soon. Estimates of synthetic fiber capacity made last December by Textile Economics Bureau (New York) indicate a capacity of 895 million lbs. by the end of '59. Yet, even if

consumption measures up to expectations, fibers plants will generally be operating at less than 60% of their potential.

And capacity may even be underestimated. Not included by TEB: the Celanese entry into polyesters, reported last week (CW, Oct. 4, p. 23); and Tennessee Eastman's start-up of commercial Kodol production. These two developments might add another 30-40 million lbs. of capacity by Dec. '59.

Despite the disparity between production and capacity, U.S. producers see a rosy, if hazy, future. For '59, an executive of one synthetic fiber firm expects "a good sales level for man-made fibers, with a noticeable increase in the noncellulosics." And

his view is typical of most producers'.

**Why Boost Capacity?** A. R. Loosli, general manager of American Cyanamid's Fibers Division, voices this widespread feeling of producers: "We're entering because we see the markets there . . . more people will want more and better clothes."

Cyanamid's 27-million-lbs./year Creslan plant will come onstream later this year, marking the firm's commercial entry into acrylic fibers. And, as if to verify its optimism, the company bought enough adjacent land to build a second plant of comparable capacity.

Another often-cited reason for increasing capacity: the decisions to launch commercial production in the fiber industry, as in most segments of the CPI, are not made with the short-range viewpoint.

Ten years' time and \$75 million of capital might be required to put on the display rack the first suit of clothes made of a new synthetic fiber.

Learning from the pioneers, the fiber makers have found that it's wise to exert quality control on goods manufactured from their products. Cyanamid, for example, says that use of its Creslan trademark "will be authorized only on products that meet Cyanamid's standards." (See p. 42.)

**Murmurs from Abroad:** Competition in synthetics is not exclusively domestic in origin. The joint venture between Celanese and Britain's Imperial Chemical Industries to make Teron polyester fiber (the same material previously licensed exclusively to Du Pont as Dacron) points up a strong foreign technology.

Another instance: Montecatini has worked for three years on polypropylene fibers—with which it hopes to penetrate the cotton market—expects about two more years of work before commercial production is initiated.

U.S. producers' reaction to foreign competition is mixed. Although a few voice pessimism, most feel that the threat from abroad might be no more serious than domestic competition.

Pinning their hopes on general business recovery and expansion of their markets, synthetic fiber makers look hopefully to that 2-billion-lbs. target for '75. Some may find the going rough in '59. But for others, the overall 20% lift promises a happy new year.

## For P-D, All Signs Point Up

**At Parke, Davis & Co. things were happening fast this week. Directors of the booming, Detroit-based pharmaceutical house voted a three-to-one stock split (subject to stockholders' approval) and a 50% increase in dividends; a big hike has been ordered in expansion spending; several profit-promising new products are on the way; and sales and earnings continued their climb.**

Queried on the reasons for the split—which triggered trading that shot P-D shares up \$14 to a high of \$112—P-D Vice-President and Treasurer D. E. Mitchelson told *CW*:

"It was a long time in the making. We started thinking seriously of a split when our stock hovered stably between 60 and 65 in 1955."

The decision was clinched by the rise in value since then, and—more important—constant improvement in long-range pharmaceuticals outlook.

P-D believes its stock should be in what Mitchelson calls the "popular price range" of \$20 to \$40. There, he hopes it will attract more individual stock buyers, as distinguished from corporate investors.

**Expansion Bound:** Now, the debt-free company—even its pension plan is completely funded—is headed for expansion. On Nov. 12, its 24,000 stockholders will be asked to approve both the stock split and an increase to 20 million in authorized shares. Of these, 15 million will be used in the three-for-one split. The remaining 5 million shares, which won't be issued immediately, are earmarked for mergers and acquisitions.

Likelihood of mergers was touched on in a speech to Washington Society of Investment Analysts last week by P-D Administration Vice-President Harold Burrows. "Two or three such opportunities look relatively promising," he said. He wouldn't comment further except to note that any prospect would normally be in, or closely allied with, the field of medicine.

**Hike in Spending:** Burrows also revealed that P-D's capital spending budget for the next five years had been boosted to \$55 million from earlier estimates of \$40 million. About \$2 million of this will be used to revitalize and modernize the company's Bay Division. Reversing its de-

cision to get out of the bandage business, P-D may soon oppose Johnson & Johnson on drug and supermarket counters, as well as push direct sales to hospitals and doctors.

The company will also beef up its overseas sales. New P-D projects revealed last week: manufacturing laboratories for Argentina and Chile and the possibility of several more in Europe's "common market" area. Already planned are new labs for Rio de Janeiro, Bombay, Rome, Bogota, Puerto Rico, Johannesburg and Brussels. Economic growth rate in the next 10 years, says P-D President Harry Loynd, will be "greater overseas than in the U.S., despite the possibilities of currency devaluation, difficulty in obtaining import permits, and increased foreign competition in the pharmaceutical industry."

**Chloromycetin Booming:** P-D's big expansion budget may also finance the often-rumored major expansion of Chloromycetin facilities in Holland, Mich. Despite P-D's denial, the rumor persists.

Chloromycetin is by far P-D's top-selling item. "This gold mine," says Vice-President Mitchelson, "probably won't be matched in my lifetime." Chloromycetin sales the first eight months of '58 are up 30% over '57's. In '57, the antibiotic alone accounted for about \$53 million of P-D's \$162-million total sales volume.

Following, in order of dollar importance are vitamins, antihistamines



P-D's Loynd: 'Greatest growth will be in overseas business.'



and polio vaccine. Most promising newcomers are Norlutin, a steroid; and Midicel, a sulfonamide. In addition, P-D's new four-in-one vaccine, Quadrigen, which protects against polio, whooping cough, diphtheria and tetanus, is slated to come on the market by mid-'59.

In addition, of 10 new central nervous system drugs under clinical investigation, three are considered "outstanding new product possibilities." P-D is also aiming tissue culture experiments at production of a "common cold" vaccine, may add three more strains to its present adenovirus product.

In all, 50 new products—ranging from hypertension drugs to protein-type hormones—are under investigation. Fifteen of these have advanced to the point of toxicity testing and 12 others will enter this phase when facilities are available.

And Parke, Davis is taking steps to ensure the flow of new products. The company's research and development budget, Burrows reveals, was boosted 21% this year, to \$8 million.

## Cobalt Outlooks Vary

Sharply divergent views on cobalt prospects come from industry spokesmen this week. While Howe Sound Co. says the "future of the domestic cobalt industry is dismal indeed," Freeport Sulphur's Nicaro Division reports its large nickel-cobalt plant—now abuilding—has sales assured through '65.

Both outlooks stem from government buying contracts. Howe's contract for sale of cobalt metal to General Services Administration expires in mid-'59, but Freeport's contract is for sale of 23,835,000 lbs. between now and '65.

Freeport is building its nickel-cobalt unit in Oriente Province, Cuba. Completion date: summer of '59. The company will ship the nickel-cobalt slurry up to a refinery in Port Nickel, La., for processing and sale to the government. Freeport's total investment: \$119 million. The contract accounts for virtually all the plant's projected output. But Freeport says it will try to sell "as much as possible" to domestic consumers.

Meanwhile, Howe is considering closing cobalt operations in Utah and Idaho when present government purchasing of the metal ends.



Reynolds' Whitaker, Warner-Lambert's Bobst: Musing on merger.

## Rx: Drugs, Plastics, Tobacco

In the drug industry this week, the news is mergers: a prospective coupling of Reynolds Tobacco with Warner-Lambert, and the acquisition of Tupper Corp. by Rexall Drugs.

Most unusual of the two is the Reynolds and Warner-Lambert deal, which last week was still being negotiated. It's the first big diversification for Reynolds—an unexpected foray into a wholly unrelated field.

**The Connection:** Explaining why he feels the merger would be advantageous, Reynolds President Bowman Gray said that both firms sell primarily consumer products and could benefit from a swap of know-how. Gray also noted that Warner-Lambert's foreign operations would be useful in selling Reynolds products abroad.

Moreover, another spokesman for Reynolds agreed that a fast-growing drug company may have an edge over others by being under the wing of a large firm such as Reynolds ('57 sales: \$1.05 billion), which could finance production of new products.

Reynolds Chairman John Whitaker and Warner-Lambert President Alfred Driscoll (former governor of New Jersey) both stress that the deal hasn't been firmed. Nevertheless, preliminary understanding has been reached by directors. If consummated, the deal will call for exchanging one

share of Reynolds Class B common stock for each outstanding share of Warner-Lambert. A formal agreement will be submitted to directors soon, and, if approved, both firms will call special meetings where stockholders will be asked to okay the merger.

**Rexall's Largest:** In another development last week, described as "the biggest acquisition in Rexall's history," Rexall Drug bought Tupper Corp., a Rhode Island plastics firm. Exact price paid was not revealed. But Rexall President Justin Dart disclosed that 175,000 shares of Rexall stock, plus "a substantial cash consideration," were involved. Dart also revealed that a \$5-million bank loan had been negotiated for the purchase.

"This acquisition," says Dart, "is a further step in the development of Rexall's Chemo-Plastics Division and will substantially increase our per-share earnings."

Tupper Corp. (headquartered in Woonsocket, R. I.) and all its divisions will remain intact but will be operated as wholly owned subsidiaries of Rexall. Tupper's Industrial Division, a processor of industrial polyolefin resins, will be expanded with new production facilities slated for two other Rexall-owned companies in Los Angeles—Chemtrol Co. and Kraloy Plastic Pipe Co. Tupper also makes plastic housewares.

# Tough Stand on Du Pont-GM

In the Du Pont-General Motors antitrust case—again on the active docket in federal district court at Chicago—a head-on conflict over terms for ending Du Pont's alleged influence on GM purchasing now seems likely to send this suit sooner or later on a second trip to the U. S. Supreme Court.

The U. S. Dept. of Justice is reiterating its demand that the Du Pont company be divested of its 22.6% holding (63 million shares) of GM common stock (*CW Business Newsletter*, Oct. 4). Du Pont and General Motors—generally supported by representatives of their stockholders—are standing pat on their plans for those GM shares to stay in Du Pont's ownership, but for voting rights to be "passed through"—on a pro rata basis—to Du Pont's stockholders.

No matter what District Judge Walter LaBuy decides about the GM stock, it seems a good bet that whichever party he rules against will ask the Supreme Court for a reversal. And this might well put the final ruling several years off.

**Tough Stand Taken:** In papers filed in LaBuy's court last fortnight, the government's antitrusters have taken what some observers regard as "the toughest stand possible" against Du Pont's plan for retention of the GM shares.

These latest documents—a legal memorandum and a 140-page economic study—present two basic arguments of the Antitrust Division:

- That Du Pont's plan would merely "result in the indirect holding by Du Pont of control of GM."

- That the "dire prophecies" by Du Pont and other parties as to the market effects of divestiture are "completely unsupported."

**Four-Link Chain:** Government lawyers say Du Pont's plan adds up to no change in the "potency of the Du Pont influence" in GM. They rest this assertion on a four-link chain: 27 individuals hold 77% of the stock of Delaware Realty & Investment Co. (and eight of those individuals hold 44% of the stock); Delaware in turn owns 32.7% of the voting stock of Christiana Securities Co.; Christiana owns 26.7% of Du Pont stock; and Du Pont owns 22.6% of GM stock.

Passing through the voting rights on those GM shares to Christiana, Delaware, and their stockholders—as Du Pont proposes—would not, says the government, eliminate the use of these holding companies "as vehicles of voting control." Instead, the government avers, the Du Pont plan would "perpetuate the opportunity to continue the domination of the GM market found to exist in the past."

**New Stock Suggestions:** It's possible that in detailing several new alternative divestiture suggestions in these latest documents, the government might be hinting that it would accept a compromise settlement.

For example, the government now proposes that a group of financial advisers be selected to handle the timing of distribution and sale of the GM shares. And it indicates it would agree to a 20-year period—instead of the 10 years originally proposed—in which to complete the divestiture.

Also suggested as ways to avoid depressing the market value of Du Pont and GM stocks, as predicted by the companies if divestiture is ordered: distribution of the GM shares to Du Pont stockholders in one year; dissolution of Christiana and Delaware; distribution of the GM stock as Du Pont dividends over a period that might be set at any time up to 22 years; or sale of all the GM stock.

**Turnover Rates Cited:** In the lengthy economic analysis, the government attempts to refute the companies' estimates that divestiture would slash the market value of Du Pont and GM stocks by 15% and 25-40%, respectively. First off, it notes that GM stock is narrowly traded relative to number of shares outstanding; turnover rate in 1956 was only 3.52%, compared with 7.8% on American Telephone & Telegraph stock. The difference in these trading rates, the government concludes, is enough "to accommodate the sale of all 63 million GM shares held by Du Pont in a period of five years."

Secondly, the government points out that former GM President Harlow Curtice once testified that GM's purchase of its own stock for its employee incentive plan has no appreciable effect on the price of the stock; the U.S. says GM has bought 14

million shares of its own stock on the open market during the past 12 years. Declares the government: "It would be economic nonsense to say that purchasing large amounts of stock has no effect on market price while arguing that selling large amounts does."

For now, Du Pont declines to comment on the government's new barrage. But its attorneys likely will have plenty to say in the courtroom debates that may get under way late this year. Dates for these hearings probably will be set at a pretrial conference called by Judge LaBuy for Oct. 31.

## New Source of Fluorine

**TVA will push high-analysis fertilizers and economic by-product recovery processes. These are the big objectives in this fiscal year's phosphate operations of the Tennessee Valley Authority's Fertilizer-Munition Development Center (Muscle Shoals, Ala.).**

This 1958-59 program—part of TVA's annual \$4-million nonpower research effort—is studded with projects whose success could point the way to new raw materials and products for commercial fertilizer producers and other chemical process concerns.

Among the major goals:

- Developing a process for economic recovery of fluorine compounds—in a form suitable for use in primary aluminum and other industries—from domestic phosphate rock. TVA figures that this could become a new commercial source supplying up to about 40% of U. S. industrial requirements for fluorine and its compounds.

- Achieving major operating economies in fertilizer operations through development of processes for recovering other waste products, such as elemental phosphorus from sludges and liquors in electric furnaces, and hydrogen and nitrogen from waste gases in ammonium nitrate units.

- Extending exploratory use of high-analysis phosphate fertilizers into new areas under TVA's two educational programs.

- Producing high-analysis phosphate fertilizer from Florida leached zone phosphate, a low-grade ore not used in present phosphate mining.

## COMPANIES

**Harshaw Chemical Co.** (Cleveland) had no trouble in selling its \$7-million debentures (*CW*, Sept. 20, p. 32) last week. The 20-year, 5% securities offering was completely sold in one day, according to a Morgan, Stanley & Co. partner, and the debentures were trading the next day at full value or at a slight premium. The company now has no debt other than these debentures, and its only other capital liability is its outstanding common stock.

**Callery Chemical Co.** (Pittsburgh) is planning a ceremony and open house Nov. 1 for the dedication of its \$38-million Navy high-energy fuel plant at Muskogee, Okla. Speakers will include Navy and Callery officials and civic and governmental leaders.

**National Aluminate Corp.** (Chicago) is acquiring Howe-Baker Engineers, Inc. (Houston, Tex.), manufacturer of oil refinery equipment. Principal products: electrostatic desalting and purifying equipment.

**Spencer Kellogg & Sons** (Buffalo, N.Y.) hints that further expansion by acquisition is part of its growth program. President Howard Kellogg, Jr., says he is pleased with results of last year's acquisition of Beacon Milling Co., but adds that no mergers are imminent.

**Air Products, Inc.** (Allentown, Pa.), is borrowing \$2.5 million to repay current bank loans and for other purposes. The new loan is on a 10-year, 4¾%, convertible subordinate note to the Sears, Roebuck & Co. employees pension fund.

**Lithium Corp. of America** (Minneapolis) is reorganizing into seven major departments: manufacturing and mining, sales, research and development, market research, manufacturing planning and engineering, financial controls, and purchasing and traffic.

## EXPANSION

**Pulp & Paper:** International Paper Co. is studying possible sites on the northern Pacific Coast for a new pulp and paper mill. Longview, Wash., and Klamath Falls, Roseburg and Medford, Ore., have been suggested. A company spokesman said a total of seven sites are under consideration.

**Industrial Chemicals:** Chemicals Inc. (Hickory, N.C.) has started construction on a new plant to make general textile, hosiery and industrial chemicals. The new unit, located in Hickory, is designed for further expansion as markets develop. Cost has not been revealed.

**Polyethylene Film:** Du Pont is building a laboratory and pilot plant to study the manufacture of polyethyl-

ene film. The new units will be adjacent to the company's polyethylene resin at the Sabine River Works (Orange, Tex.).

**Antifoam Agents:** E. F. Houghton & Co. (Philadelphia) has purchased the plant formerly owned by Stylewise Hosiery Mills in Carrollton, Ga., will re-equip and expand the unit for production of paste-type antifoam agents used in the pulp and paper industry. Several specialty items will also be produced.

**Glass:** Pittsburgh Plate Glass Co. will build a multi-million-dollar glass fabricating plant on a 49-acre site just east of Crestline, O. The one-story unit, scheduled for completion in '59, will employ more than 250 workers. Glass supplies will come from the company's window-glass plant in nearby Mt. Vernon. The new plant is designed primarily for tempered glass.

## FOREIGN

**Chemicals/Europe:** Two of Europe's largest chemical companies report that first-half sales are down from last year's; but a third firm is expecting the full year's sales volume to be an all-time record.

• **Imperial Chemical Industries** (London) says its first-half sales were \$649.6 million—\$8.4 million less than in the first six months of '57 but \$11.2 million more than during last year's second half. Pretax income was \$68.3 million, compared with \$84.6 million in the first half of '57.

• **Montecatini General Mining & Chemical Corp.** (Milan) says first-half net sales dipped 2.1%, to \$149.2 million; net income down 1.2%, to \$8.6 million.

• **Farbenfabriken Bayer** (Leverkusen) expects '58 sales to reach \$480 million, compared with \$440 million recorded in '57. President Ulrich Haberlund says all of the company's product lines are expected to share in the upswing.

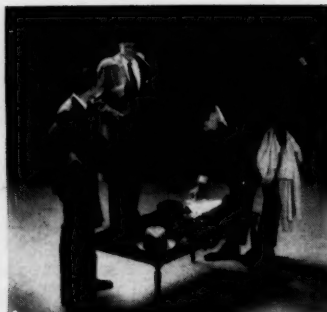
• **Industrial Gases/Mexico:** NCG International, a subsidiary of Chemetron Corp. (Chicago), has acquired "substantial interest" in four producers and one marketer of industrial gases in Mexico.

• **Epoxy Resins/Australia:** Shell Chemical (Australia) Pty. Ltd. will manufacture solid and liquid epoxy resins under the tradename Epicote in a \$1.3-million plant to be built at Sydney. It will be Shell's second chemical plant in Australia; its sulfuric acid plant at Geelong is expected to be onstream next month.

• **Plastics/Russia:** Under a \$618-million (at official exchange rate) modernization program for all industries in the Moscow area, the Soviet government is planning to install automation for "all the main processes" in that area's plastics plants and to develop continuous processes for production of synthetic fibers.



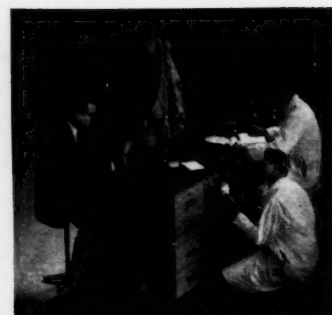
*The men  
that make  
the most  
of them . . .*



## test your Polyol I. Q.

**How well do you know your Polyols?** Here are questions about a few of the hundreds of Polyols that Dow makes. Some of them are common as can be, some not so common, others you may not have heard of. How many can you name?

**TIME ALLOWED: 4 MINUTES. READY . . . GO!**



**1.** Where hair dressings require a water-soluble base with oily characteristics, what five-digit Polyol fills the bill?

\* \* \* \*

**2.** In the manufacture of specialty coatings, what polyglycols (used as intermediates) give greater flexibility and resistance?

\* \* \* \*

**3.** In the making of rubber tires, what Polyols with quali-

ties of low rubber swell, good water or organic solubility, are used as lubricants?

\* \* \* \*

**4.** What polypropylene glycol is useful as a mold release agent and plasticizer in plastisols?

\* \* \* \*

**5.** What polyglycol, when added to wax formulations, contributes to high gloss without lowering melting temperatures?

**6.** Name three urethane products that can be made from the wide range of available resin grade polyglycols?

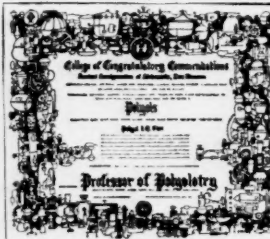
\* \* \* \*

**7.** What is the principal reason resin grade polyglycols are specified by the urethane industry?

\* \* \* \*

**8.** What other advantages do resin grade polyglycols offer the urethane industry?

**HOW TO SCORE:** A score of 4 out of 8 puts you in the top half of the class, 6 makes you a real promising Polyoler, and 8 out of 8 makes you a Professor of Polyolotry. If you think you have earned it, write for this free "Certificate of Commendation" testifying to your Polyol prowess. 12" x 15" suitable for framing. Include your full name so the certificate can be personalized. We hope this quiz whets your appetite to know more about Polyols. Many brochures, technical papers and bulletins, including Dow's new folder, "World's Widest Line of Polyols", are available from your nearest Dow sales office. Or, write THE DOW CHEMICAL COMPANY, Midland, Michigan, Department GD 955A.



### ANSWERS:

(1) Polyglycol 15-200. (2) Polyglycol 15 series, plus consistent reaction rates. (3) Polyglycol P-2000. (4) Polyglycol P-2000. (5) Polyglycol P-2000. (6) Flexible foams, elastomers, casting resins, and fibers. (7) Consistent urethane reaction rates. (8) Very narrow molecular weight range, low water content, low unsaturation plus consistent reaction rates.

YOU CAN DEPEND ON

**DOW**



# Washington Newsletter

CHEMICAL WEEK

October 11, 1958

## The government is pressing for more industrial isotope research

—and it's willing to pay for it to the extent of \$3,650,000 by next July 1. The Atomic Energy Commission is convinced that radioisotopes have an almost unlimited industrial potential.

Proposals for AEC-financed isotope development contracts are invited from industrial organizations and research labs. Information submitted will be treated as "business confidential," if so requested. But if you get a contract, all technical information developed will be government property and disseminated for public use.

AEC may ask proposals for work on specific projects in cases where fundamental studies must be completed before industrial applications can be explored.

The 12 contracts already awarded this year give some clues to the commission's broad interest:

- Tracerlab, Inc., has a \$49,000 contract to develop a radiochemical analyzer for nonradioactive gases and clathrate compounds.
- A group, including General Aniline & Film Corp., is making a broad technical, economic and managerial study of industrial applications of high-level radiation.
- Atomics International is looking into the technical feasibility of using radioactive sodium coolant at the Hallam, Neb., nuclear fuel power plant for industrial radiation processing.

•

Soviet Union is learning that it can't dump its exports on world markets with impunity. This was demonstrated last week when the Russians agreed to limit next year's exports of unwrought aluminum to Britain to 15,000 metric tons. This has brought hope to the tin market, too, that Soviet dumping may be brought under some control.

Russia's agreement to limit its aluminum exports follows protests on both its tin and aluminum exports from countries with which Khrushchev would like better relations—among them Malaya, Indonesia, Bolivia, Thailand, Canada, and Britain.

U.S. officials say the Russians may also fear loss of markets in which they want to earn hard currencies. Britain slapped a tough quota on imports of tin from Russia, and there has been much talk of moves by non-Communist nations to counter Russian dumping.

The new quota offered by Russia is high—amounting to seven times its exports to Britain in 1955. It does represent, though, a cutback of 5,000 tons from anticipated exports to Britain this year.

# Washington Newsletter

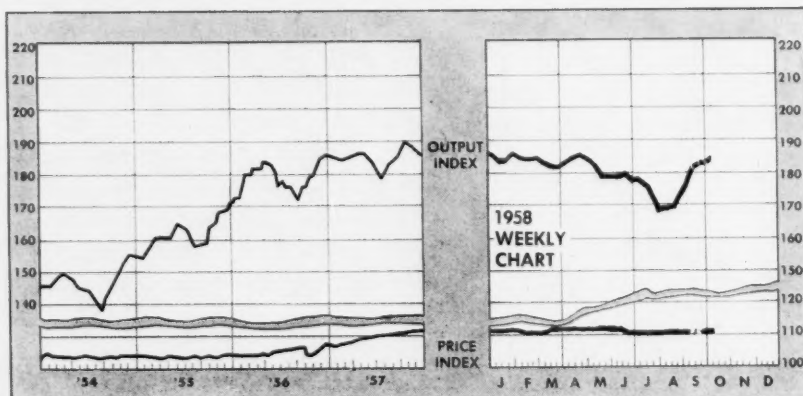
(Continued)

**Anticancer agents will hold the spotlight** at the sixth annual antibiotics symposium in New York City, Oct. 15-17. An entire session of the conference will be devoted to reports on current experiments with antibiotics in treating tumors, with seven papers alone being devoted to work with Parke, Davis' Actinobolin and a report by Japanese scientists on Mytomycin-C.

But, don't look for any dramatic break in Lederle's efforts to get Food & Drug Administration to okay use of Aureomycin as a fish preservative. The agency reportedly still isn't satisfied it can write a safe tolerance for this use—despite its approval of antibiotics for preserving poultry as well as Canadian approval of such drugs by fish processors.

**The Pentagon has liberalized military procurement regulations** dealing with contractors' "proprietary rights"—i.e., manufacturing methods or processes, treatment and chemical composition of materials, plant layout and tooling, and other manufacturing secrets.

The most important changes provide that (1) there is no longer a blanket requirement that the contractor give the military services his trade secrets (they must be specifically demanded in procurement contracts); (2) proprietary rights for so-called "standard commercial" products will be furnished to the military only through "specific negotiation for such data"; (3) trade secrets are no longer required for items incorporated as components in an R&D project if the items were developed at private expense and previously sold on the open market.



## Business Indicators

### WEEKLY

	Latest Week	Preceding Week	Year Ago
Chemical Week output index (1947-49=100)	188.5	186.0	189.0
Chemical Week wholesale price index (1947=100)	110.5	110.6	111.0
Stock price index of 11 chemical companies (Standard & Poor's Corp.)	45.56	45.47	41.08

### MONTHLY

Production (Index 1947-49=100)	Latest Month	Preceding Month	Year Ago
All manufacturing and mining	136	126	145
All chemical products	181	173	181
Industrial chemicals	182	177	200



# ESSO LAKTANE *RSVP*

Here's an unusual solvent in search of further uses. Wherever you need a high-solvency, fast-drying solvent with controlled evaporation, a "clean" odor, low residue, and reasonable price, we suggest that Esso Laktane may well be able to *cut your costs* and *improve the results*. A product of Esso Research, it is already the proven quality-leader in rotogravure printing and in the lacquer industry. But we think you'll be interested in its uses in producing neoprene rubber products and vinyl organosols, among many other potential uses. With uniform quality and *immediate availability* as well as *low cost*, you'll find that you are indeed *answering an invitation to higher profits*. Esso Standard Oil Company, Inc., 15 West 51st Street, New York 19, New York.



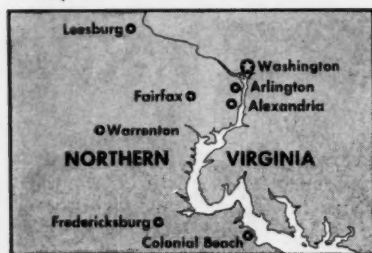
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Today, the electronics industry is finding a most congenial home here. So are many other light, or technical industries. And building ahead of their growth, Veeco's electric power network now has 640,000 kilowatts more generating capability under construction—to step up its total to 2,171,900 kw by 1960.

If you plan a plant or laboratory, consider the advantage of being close to the research facilities of the Nation's capital . . . in an area where the educational level of workers is 30% above the U.S. average. For more facts, or for confidential site-finding help in this land of mild climate, top transportation, friendly government, and delightful living . . . write, wire or phone Veeco, serving "The Top of the South" in Virginia, West Virginia and North Carolina.

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# ADMINISTRATION



Entries pour into California anti-'right to work' office as contestants guess on proposed law outcome.

## 'Right to Work' Battles in 11th-Hour Rush

In at least six states this week, political campaigns strongly hinged to the so-called "right to work" issue are now reaching a full head of steam. These states, in most cases, have chemical industry plants whose labor contracts could be vitally affected by such legislation. Here's CW's state-by-state study of the campaigns, their aims and chances.

The right-to-work controversy has been attended by much confusion, exaggeration and distortion. It has stimulated some widely reported ballyhoo—as in California, where publicity-wise opponents of right-to-work legislation are sponsoring a contest (*see cut*) with a \$5,000 prize to the entrant guessing the margin of votes by which the right-to-work referendum on November's ballot will be defeated. One result: the issue has drawn to both sides surprising num-

bers of ordinary citizens, politicians, labor leaders, clergymen and businessmen.

**Phrase-Maker's Choice:** Much of the heat of controversy stems from the confusion. Different groups call the aim of the legislation different things: labor calls it "oppression of labor," management titles it "protection of freedom of choice."

Simply put, right-to-work legislation bans the contractual agreement between union and management known as "union shop"—working units in which all workers are bound to join the union. Right-to-work does not mean that all employees at a union location are precluded from joining a union. It means merely that they may not be forced to join under terms of a contract between union and employer.

Labor opponents claim that this

prevents labor from effectively organizing, that it encourages free-loaders to ride along on union-won gains, and that it is a management-inspired effort to undermine unions.

Management adherents say that it is a counterweight to the monopoly powers of unions, that it preserves for the individual his freedom of choice as to whether he wishes to join an association or not, and that it permits him an opportunity to work wherever he pleases.

Among arguments ranging further afield are labor's contentions during the recession that right-to-work legislation has failed to guarantee maintenance of jobs and that association of wage-earners with widely ranging talents and training can be compared to the association of doctors and lawyers in medical and bar societies.

Management has at times suggested

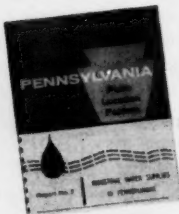


*If your company  
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**INDUSTRIAL  
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**New 88-page report, just released,** summarizes basic water data most commonly used by industries in evaluating areas for plant locations, including:

1. Availability of Water in Pennsylvania
2. Basic Data (climatological, stream flow, ground water, etc.)
3. Water Use in Pennsylvania
4. Water Resources by Drainage Basins
5. Ground water
6. Range of pH and Water Hardness Values of Pennsylvania Streams at Key Sampling Stations
7. Bibliography of Water Supplies and Their Treatment

Also included are 14 maps and tables pertaining to the above subjects.



You may obtain copies of this valuable report, without cost, by writing on company or business affiliated letterhead to:

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333 State Street  
Harrisburg, Pennsylvania

## ADMINISTRATION

right-to-work legislation to lure manufacturers to a particular region and as a cure-all for labor abuses—rack-teering, etc.—such as were revealed in recent Congressional hearings.

**Serious Step:** In any case, right-to-work legislation cannot be taken lightly. Adoption of such laws is often a complicated step—and may have serious consequences. In some states, before a specific law is adopted, a constitutional amendment is required, or an "initiative" procured by the tedious device of getting hundreds of thousands of signatures on a petition. Once passed, the legislation may suddenly upset thousands of labor contracts then in existence.

On the federal level, there's little likelihood that national right-to-work laws could be passed in the foreseeable future. The Administration insists it has expressed itself against tampering with state sovereignties in this area. Moreover, no aspirant to national leadership in '60—with the exception of Senator William Knowland, now campaigning for the governorship of California — has expressed any willingness to alienate labor votes by endorsing right-to-work legislation.

Eighteen states, many of them strong chemical producing areas, have right-to-work laws or constitutional amendments providing climates for enactment of such laws. They are Alabama, Arizona, Arkansas, Florida, Georgia, Indiana, Iowa, Mississippi, Nebraska, Nevada, North Carolina, North Dakota, South Carolina, South Dakota, Tennessee, Texas, Utah and Virginia. Asking voter action in the November elections are six others: California, Colorado, Idaho, Kansas, Ohio and Washington. Montana will not have a test because backers failed to get sufficient signatures to obtain a referendum.

California is held by some to be a bellwether on the future success of such legislation. Certainly, much publicity has attended efforts to uphold county laws, and Knowland has utilized Presidential statements—since clarified by President Eisenhower—apparently backing right-to-work but actually taking a hands-off position. But politics is a hard environment in which to seek a bellwether. In Indiana, for example, where a right-to-work law was passed a year ago, results of primaries last May added

up to a virtual standoff on the controversy. Nine of 11 senators who voted for the law won renomination while 12 of 14 senators who opposed it also won places on the November ballot.

A *CW* survey of the six states indicates that five of the measures will probably fail, with only the Kansas contest shaping up successfully.

Some measure of the impact of right-to-work legislation—or lack of it—is available. In South Carolina, where such a law has been in effect since '54, a *CW* examination of standard economic indicators shows little, if any, evidence to back up claims on either side of the issue.

There, opponents such as Sinway Young, head of the AFL-CIO State Labor Council, calls it a law to "weaken labor unions and prevent them from organizing." He says that a slow process of attrition is at work undermining existing labor unions and that the majority of new investment in the state has been by small plants that exploit labor. He argues that limiting union organization means less industry for the state, lower incomes, less taxes, poorer schooling and a generally lower economy.

Proponents, such as John Cauthern, executive vice-president of the South Carolina Textile Manufacturers Assn., say that the law has reduced industrial strife and has meant steadier employment, that industry has thrived and that workers apparently like the law.

A study of union organization in the textile industry—which hires about 68% of South Carolina's manufacturing employees—shows no significant change in unionization—running about 5% of the total employed—since the advent of right-to-work legislation.

On the matter of time losses due to labor disputes, a look at state labor department data shows an increase in the 1956-57 fiscal year over the 1953-54 year, but the increase amounts to 5½ ten-thousandths of 1%. In the meantime, employment in the industries covered increased 2½ times.

In capital investment, the figures show that in 1953-54, \$1.15 billion was invested in 1,958 South Carolina firms and that in 1956-57, 2,150 plants reflected a capital value of \$1.32 billion.

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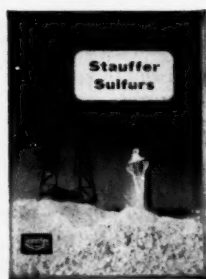
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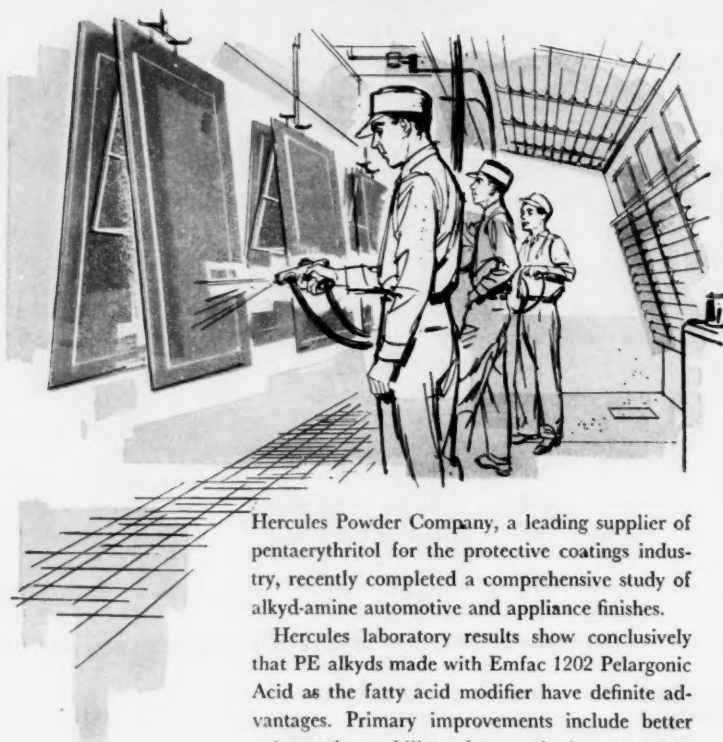
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Hercules Research Reveals

# PE ALKYDS MADE WITH PELARGONIC ...IMPROVE METAL FINISHES



Hercules Powder Company, a leading supplier of pentaerythritol for the protective coatings industry, recently completed a comprehensive study of alkyd-amine automotive and appliance finishes.

Hercules laboratory results show conclusively that PE alkyds made with Emfac 1202 Pelargonic Acid as the fatty acid modifier have definite advantages. Primary improvements include better color, color stability, gloss, and gloss retention. Other advantages are hardness, resistance to dirt pick-up, and alkali resistance.

Since Emfac 1202 Pelargonic Acid is competitive in price with other fatty acid modifiers, your PE alkyds can have these superior properties with no increase in cost. Begin your evaluation of PE-pelargonic alkyds today. Trial samples of Emfac 1202 are available on request.



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Cincinnati 2, Ohio

## ADMINISTRATION

### Manpower Talks Held

Industrial personnel managers are likely to adopt a wait-and-see policy with regard to large-scale hiring and rehiring of manpower, despite a bottoming out of the recession and an apparent economic upturn.

This was the consensus of some 1,000 personnel and labor relations executives—including a sizable number from chemical process companies—who, by last week, had synthesized remarks from papers they heard delivered at the recent American Management Assn. fall personnel conference in New York.

During the three-day conference—the first of 26 large-scale AMA conferences in various fields of management scheduled through June '59—participants heard a variety of opinions on two broad categories: labor relations and wage-salary administration.

**Pricing Management:** Theodore Weissinger, manager of Du Pont's salary classification division, and a member of a conference panel discussing personnel problems, talked of two approaches to the pricing of management positions.

The first approach, he said, establishes management salary levels by direct comparison with values in the marketplace.

When using the second, or motivational approach, Weissinger said, the base of the structure must be tied in some way to the wage-roll group, since in industry some of the first steps of the ladder are filled by promotions from that group.

**Labor Relations:** Speaking on the problems of work and authority, Oliver Ohmann, employee relations manager, Standard Oil of Ohio, told conferees that a trend has developed in the direction of giving the worker a "whole" job, which includes some responsibility for planning and evaluation and improvement of results.

Windup of the conference was the luncheon presentation of the Henry Laurence Gantt gold medal for '58 to Procter & Gamble Board Chairman Richard Deupree.

The medal—sponsored jointly by AMA and American Society of Mechanical Engineers—was presented for "distinguished achievement in industrial management as a service to the community."





## MEMPHIS WATER IS G-O-O-D!

Yes, Memphis' artesian water *is* good! It has traveled through many miles of sand and gravel—receiving nature's best filtering action—to the multi-billion-gallon reservoirs which lie at 500 and 1,400 feet below Memphis.

The water delivered to the Memphis Water Division's customer is potable and dependable. Memphis' artesian water is a soft bicarbonate water, low in sulfates and chlorides and contains no organic matter. This water readily lends itself to production of high-quality water for industrial use and has no taste nor odor. Water well temperature at 500 feet is approximately 65°F.

The Water Division's 108,000,000-gallon-a-day system serves the homes of over 500,000 people and small commercial and industrial firms. Many large commercial and industrial firms have private wells. The Memphis water system

is designed to provide the necessary fire flow to fight the worst imaginable conflagration even on a day of maximum demand for water for normal purposes. Because of this, and the City's highly rated Fire Department, Memphis enjoys Class II insurance rates, the lowest available.

Thousands of acres of industrially-zoned sites offer a wide variety of plant locations in the immediate Memphis area. Chemical industries now located here offer many basic intermediates.

In Memphis the combined cost of water, electricity, natural gas, taxes and insurance is lower than any comparable city in the nation. There are many other reasons why Memphis on the Mississippi merits full investigation by site-seeking chemical industries. Get all the facts—mail the coupon today.



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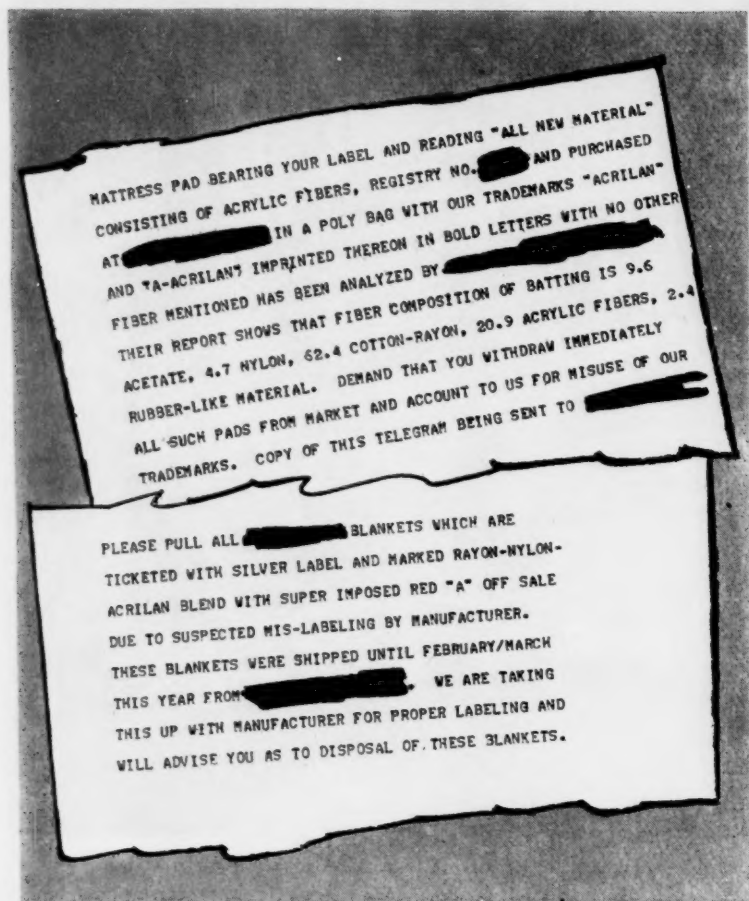
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☐ Check here if you want kit sent in plain envelope marked "Personal."



Example of new Chemstrand policy hitting Acrilan labeling violations.

## Beefing Up for Mislabeling

Chemstrand Corp. last week withdrew a special Acrilan display unit and its retail demonstrator from Stern Bros., the major New York department store owned by the giant Allied Stores Corp. chain.

Reason: Chemstrand felt that the store had improperly advertised merchandise that contained Acrilan. The move marked another step in Chemstrand's recently beefed-up drive to block misleading labeling of products manufactured with its trademarked acrylic fiber.

Chemstrand's drive is noteworthy for other manufacturers of consumer products containing trademarked components, because it departs from the normal procedure used in dealing with mislabeling incidents.

Usually, for example, a company

doesn't take particular pains to inform the public that it intends to step up efforts to prosecute trademark violators or those guilty of mislabeling.

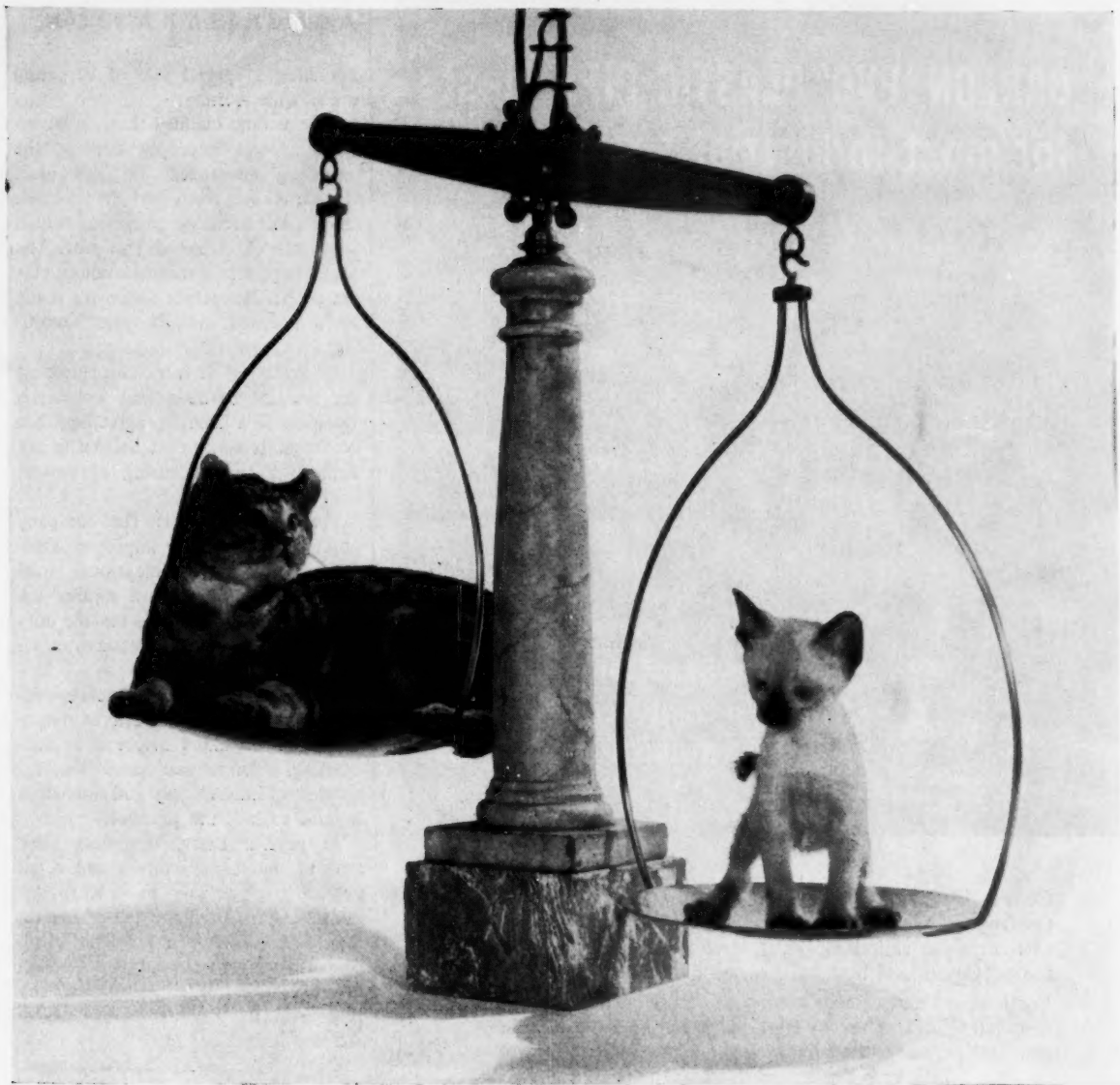
**New Policy:** In its latest efforts, Chemstrand not only has "doubled the watch" for violators but also has launched a program to tell the trade and public about mislabeling as it occurs—and what the company is doing about it. Chemstrand tells *CW* that even the violators approve of the new program, say they're glad mislabeling has been brought out into the open. Violators often said they tried mislabeling because their competition did.

Withdrawal of a representative and display unit from Stern's followed the publication on Sept. 21 of an advertisement in the *New York Times* an-

**ARGUS**

*announces*

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## LESS GIVES YOU MORE

**NEW MARK LL** powerful vinyl stabilizer — latest addition to the Argus line — gives you more and better stabilization at *less* cost. Easily dispersible liquid Mark LL stabilizer will give you:

**MORE** heat stability;  
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Whatever your vinyl processing problem, Argus has the answer — in line products or in its research laboratory.

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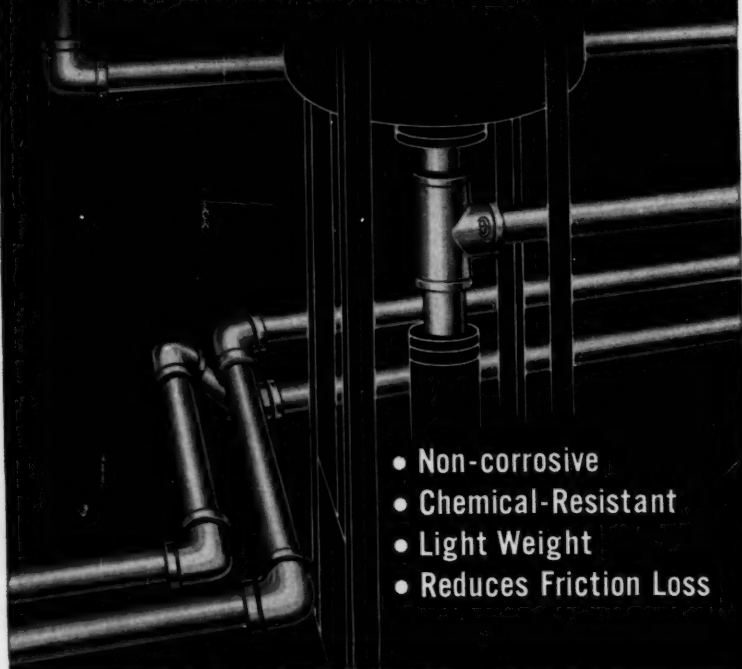
Main Office: 633 Court Street, Brooklyn 31, N. Y. Branch: Frederick Building, Cleveland 15, Ohio

Rep's.: H. M. Royal, Inc., 4814 Loma Vista Ave., Los Angeles; Philipp Bros. Chemicals, Inc., 10 High St., Boston; H. L. Blachford, Ltd., 977 Aqueduct St., Montreal.

October 11, 1958 • Chemical Week

43

## CARLON "PVC" PLASTIC PIPE: best for most industrial applications



- Non-corrosive
- Chemical-Resistant
- Light Weight
- Reduces Friction Loss

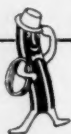
Carlton "PVC" Plastic Pipe and matched fittings are resistant to many oxidizing chemicals and acids. Its ability to withstand this corrosive action makes it ideal for the transmission of fumes, vapors and liquids in varied industries.

Light weight and ease of joining mean savings up to 50% on installation costs. Carlton "PVC" pipe can be cut with a hand-saw and permanently joined to fittings by solvent cementing . . . no special tools needed.

Because of the mirror-smooth inner wall, flow loss due to friction is reduced 20% . . . no corrosion deposits to build up and decrease efficiency. Lower resistance to flow enables smaller diameter pipe or smaller pumping units to be used to deliver the same volume.

ADVERTISED IN **LIFE**

For complete information and specifications, send for free brochure on Carlton "PVC" and Fittings.



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## ADMINISTRATION

nouncing a special sale of carpeting made with Acrilan.

Chemstrand claimed that the advertisement was improper because the carpeting advertised did not meet standards set forth by the Acrilan trademark licensing program, which went into effect earlier this year. The program prohibits identification of carpet as Acrilan carpet unless it's made by a licensed manufacturer according to Chemstrand standards.

Chemstrand is now investigating the incident to determine whether a violation of a licensing agreement has occurred. It states that Stern's is not a party to any licensing agreement with the company.

**Duty to Consumer:** The company points out that since improper labeling, inadvertent or intentional, misleads the consumer and injures the company's good name, it has the duty "to take any and all measures available" to block it.

In its initial public release describing its new policy toward manufacturers and retailers involved in mislabeling, Chemstrand cited six examples of mislabeling and the steps it took to halt the practice.

In several cases, telegrams were sent to the manufacturers and retail outlets involved (see p. 42). In another instance, Chemstrand had a manufacturer send a letter to every store that had purchased blankets said by Chemstrand to be mislabeled. The retail stores were advised to remove Acrilan labels.

Chemstrand reports that, in general, retail outlets and most manufacturers are cooperative. "A few, however, have shown some reluctance," company officials say. "In these cases, Chemstrand is taking legal action."

## LEGAL

**Du Pont Tax Case:** A \$1.8-million tax suit involving Du Pont, the federal government and the state of South Carolina is under way in Columbia, S.C. The Wilmington company seeks a permanent injunction barring the state from collecting sales and use taxes on construction materials and other items used at the Savannah River plant (Aiken), which is owned by the Atomic Energy Commission and operated by Du Pont.

The suit is being heard by a special three-judge court headed by Chief



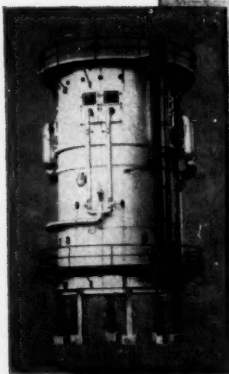


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**for producing  
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October 11, 1958 • Chemical Week



**Judge Sobeloff:** He heads court hearing Du Pont's \$1.8-million tax suit.

Judge Simon Sobeloff, of the fourth circuit court of appeals (*see cut*). Fourth Circuit Judge Clement Haynesworth, Jr., and District Judge George Timmerman, Sr., are other members of the court.

Du Pont and the federal government both argue that since Du Pont operates the plant solely for the government, any tax on the plant or its operations should be billed to the government. This would amount to the state taxing the federal government, which is prohibited by the federal constitution.

All—the state, the U.S., and Du Pont—agree that Du Pont acted in behalf of the U.S. as operator and exercised no separate interest in the property involved. All also agree that Du Pont at no time acquired title to the H-bomb plant. But the state disagrees with the U.S. and Du Pont on the amount of control exercised by AEC over Du Pont.

The state tax commission contends that Du Pont is not different from other contractors dealing with the federal government and should be subject to sales and use taxes of 3% during its five-year operation of the plant.

The court has given Du Pont and the government until Nov. 15 to file briefs, with the state getting 30 days after that to file a reply. Both sides then have until Jan. 12, '59, to file supplemental replies. Then, the court will take the case under advisement.

## LABOR

**Policy Change:** National Labor Relations Board, in a sudden change of policy, said last week that from now on it will treat all long-term labor contracts as though they were two-year contracts. As a result, rival unions will be free to challenge a union's right to represent workers two years after a contract is signed.

NLRB says its previous rule—which banned such challenges even if a contract ran for more than two years, if it covered a "substantial part of the industry"—was too difficult to administer. The new, unanimous, decision declares a five-year contract does not give employees enough freedom of voice in selecting a bargaining agent; the two-year period was selected as a more reasonable length of time—long enough to "foster stability in labor relations," yet more conducive to the "exercise of free choice by employees." The board also points out that, despite a trend toward longer contracts, most contracts run for two years or less.

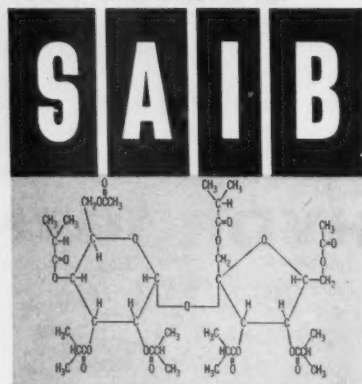
**Libel Suit:** Charges growing out of a strike at Standard Oil Co. of Indiana's Mandan, N. D., refinery—under way since early September—have taken the form of a \$50,000 damage suit against Local 725, International Union of Operating Engineers. The company claims the union and its officers have caused widespread publication of maliciously false statements constituting libel against it.

T. E. Stockdale, refinery manager, said the refinery had temporarily transferred "some experienced supervisors from other refineries to prevent dangerous and costly damage to the dismantled and idled facilities" when the strike began. Union leaders, he said, claimed the company was "importing labor goons to incite riots."

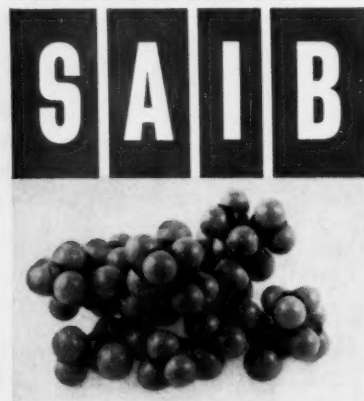
**Strikers Fired:** Olin Mathieson's Alton, Ill., explosive and solid propellant plant has fired 19 employees for precipitating an unauthorized strike. The strikers, members of Lodge 554, International Assn. of Machinists, claimed they had not received overtime pay for work on Labor Day. In a letter to plant management, union officials disclaimed responsibility for the strike, said it had no connection with contract negotiations.

## Eastman Announces

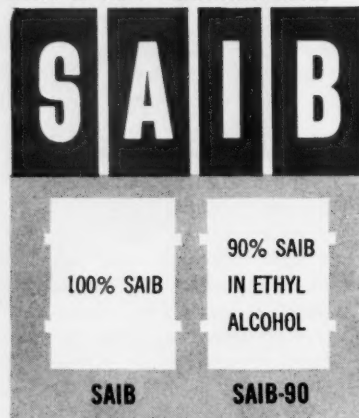
This is the formula for



This is the structure of



This is how Eastman sells



For more information see opposite page

# SUCROSE ACETATE ISOBUTYRATE

**New resin extender offers outstanding thermal and hydrolysis stability, wide compatibility, low volatility...for lacquers, hot melts and peelable coatings**

Here is a new chemical product, Sucrose Acetate Isobutyrate (SAIB), so unlike any known product that its performance characteristics are difficult to classify. Generally, however, they lie between those of a plasticizer and a resin.

## Heavy, Compact Molecule

SAIB is made by esterification of sucrose with acetic anhydride and isobutyric anhydride. The result is a clear, extremely viscous liquid of high molecular weight (847). In fact, SAIB is believed to be the heaviest organic monomeric molecule available on a commercial scale. Despite its high molecular weight, SAIB has a singularly compact molecular structure.



Figure 1

## Good Permanence

This compactness accounts for SAIB's outstanding stability to heat and water. For example, after six days at 350°F, SAIB shows a change in Gardner color from 3 to only 10. Hydrolysis, after refluxing in water for 4 days, amounted to less than 0.35%. With a boiling

point above 550°F, fuming of SAIB is virtually non-existent at melt temperatures in the neighborhood of 350°F.

## Viscous, Soluble, Compatible

The viscosity of SAIB is so high at room temperature, its characteristics approach those of a semi-solid (100,000 centipoises at 30°C). Viscosity changes rapidly with temperature, however, dropping to 4,800 centipoises at 50°C and to 90 centipoises at 100°C. The extreme solubility of SAIB is indicated by the low viscosity (750 centipoises at room temperature) of 90 parts SAIB dissolved in only 10 parts of ethyl alcohol. (See Figure 1) It is in this 90% SAIB-10% ethyl alcohol solution, as well as in the 100% concentrate, that Eastman markets SAIB. In addition to good solubility, SAIB is compatible with a broad range of resins, plasticizers, oils and waxes.

## Solvent Coatings

In solvent coating formulations SAIB serves to extend solids content without significantly affecting the ultimate physical properties of the film. For example, the solids content of a lacquer system based on 1/2 sec. RS nitrocellulose can be increased from 20% to 33% by replacing half the nitrocellulose with SAIB, without affecting film hardness or viscosity. Thus, greater surface area coverage per gallon of lacquer can be achieved with reduced solvent requirements. In addition, an improvement in adhesion has been noted.

## Hot Melts, Peelable Coatings

Tough, flexible melt coatings can be prepared containing up to 70% SAIB. Properly formulated, such coatings have excellent color stability and exhibit good adhesion, gloss and scuff resistance on paper and cloth. They are also

characterized by an absence of fuming at melt temperatures.

Peelable plastic coatings containing high percentages of SAIB are highly resistant to exudation and retain their flexibility. (See Figure 2)



Figure 2

As a new and unique chemical compound, SAIB is being evaluated by Eastman's Customer Service Laboratories for many industrial applications. A newly published bulletin on this sucrose ester is available. It contains typical formulations for a variety of solvent and melt-type coatings, as well as a description of SAIB's unusual physical properties and performance characteristics. For your copy and for a sample of SAIB, write to Chemical Sales Development Department, Chemicals Division, Eastman Chemical Products, Inc., Kingsport, Tennessee.

**SAIB**  
SUCROSE ACETATE ISOBUTYRATE

**Eastman** CHEMICAL PRODUCTS, INC., KINGSPORT, TENNESSEE, subsidiary of Eastman Kodak Company



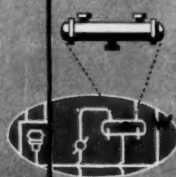


# EXOTIC FUELS

## HIGH-ENERGY HORIZONS

The design and manufacture of heat exchangers for the production of liquid propellant fuels represents a rapidly expanding field of endeavor at Western. With a reputation for reliability well established through intensive production of heat exchangers, Western's broad engineering and fabricating experience fully prepares us to cope with the heat transfer problems in the production of vital "exotic" fuels.

**Meeting the challenge of new horizons has long been the key to Western's continued expansion in the building of high quality heat exchangers.**



**WESTERN**  
**HEAT EXCHANGERS**  
**WESTERN SUPPLY COMPANY**  
P. O. Box 1888 - Tulsa, Oklahoma

## ADMINISTRATION

In another firing incident, National Labor Relations Board has, in effect, upheld Kennecott Copper Co.'s discharge of five employees at its Ray Mines Division, at Ray, Ariz. They were adherents of a union other than Mine, Mill & Smelter Workers, official bargaining representatives for workers at the plant. The board said the reason for which the company fired the five employees—that they engaged in an unauthorized strike—was a proper one.

## KEY CHANGES

**J. G. Morrison** and **William P. Jeffery, Jr.**, to vice-presidents, Vick Products Division, Vick Chemical Co.

**John N. Cosby** to director of research and development, Barrett Division, Allied Chemical.

**Thomas E. Moffitt** to president, **Thomas F. Willers** to treasurer and **John S. Coey** to director, Marble-Nye Co. (Worcester, Mass.), subsidiary of Hooker Chemical Corp. **Moffitt** was named chief executive officer of the parent company.

**John C. Bierwirth** to vice-president, National Distillers & Chemical Corp. (New York).

**J. Harvie Wilkinson, Jr.**, to director, Freeport Sulphur Co. (New York).

**S. S. Isquith** to vice-president, Resin Research Laboratories (Newark, N.J.).

**Louis W. Munchmeyer** to vice-president in charge of industrial chemical manufacturing for the entire company; **George W. Schwarz** to treasurer; and **Donald R. Hibbert** to controller and assistant treasurer; all of Wyandotte Chemicals Corp. (Wyandotte, Mich.)

**H. G. Bixby** to director, Detrex Chemical Industries.

**Fred W. Thomas** to executive vice-president, Spencer Kellogg & Sons (Buffalo, N.Y.).

**G. S. Kennedy** to executive vice-president; **E. O. Boyer** to vice-president and administrator for flour, feed and oilseeds operations; and **B. W. Roberts** to vice-president and general manager of Sperry operations in the Western states; all of General Mills.

**Peter H. Lauer** to treasurer, Flexonics Corp. (Maywood, Ill.).



# Progress Report...

— CELLOSIZE  
hydroxyethyl cellulose  
— Alkylene amines  
— Solvents and plasticizers

## CELLOSIZE H-E-C for creamy-smooth cosmetics

For many applications, CELLOSIZE hydroxyethyl cellulose is superior to other water-soluble materials, such as natural gums, resins, and starches. Its uniformity and stability with respect to solution viscosity covers a wide temperature range. Because of its unique stabilizing and thickening action, H-E-C improves the smoothness and spreading properties of many types of cosmetics. When properly plasticized, it becomes an excellent film-forming compound for hair conditioners, wave sets, and pigmented preparations. It provides extra body to shampoos, lotions, and facial and deodorant creams.

CARBIDE's new, expanded facilities are producing higher quality hydroxyethyl cellulose of uniform particle size. It is better than 99.5% soluble, in hot or cold water, and goes into solution readily. Five viscosity types are available. The ease with which H-E-C can be handled, its fast solubility, and the wide formulating latitude of this nonionic compound make it extremely useful. Check the coupon to obtain a Technical Bulletin on CELLOSIZE H-E-C which contains many suggested applications.

## Controlling metallic ions by chelation

All too often, metallic ions in a liquid system can cause destructive chemical reactions. One of the best ways to control metallic ions is through the unusual process of chelating. Chelating materials actually reach out and envelop metallic ions, and then hang on to them so they can cause no ill effects.

Stable, water-soluble chelating agents made from CARBIDE's alkylene amines reduce contamination, discoloration, rancidity, odor, decomposition, and other adverse effects due to the presence of metallic ions. Propylene diamine is used to make a disalicylaldehyde derivative that sequesters

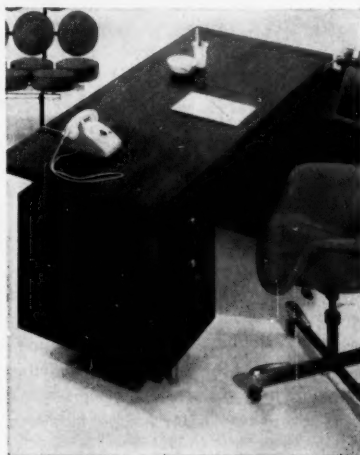
copper ions in fuel oils and high octane gasoline to prevent oxidation and the accumulation of gummy residue.

Other alkylene amine derivatives provide the ideal means for introducing metal ions in soluble, nonionic form. For example, in agriculture they can be used to help cure iron deficiency in growing plants.

These and other applications for CARBIDE's alkylene amines are described in an 8-page booklet. Check the coupon for your copy.

## Fine finishes for furniture

In the eyes of the decorator and home owner alike, appearance is the persuading factor in furniture purchases. Even though the wood and the design are acceptable, a finish that fails to interest can stop the sale right at the start.



Leading furniture makers have found that commercial buyers look for clarity, transparency, and color depth of the finishes on both traditional and contemporary styles. To give their products these qualities, many manufacturers have turned to CARBIDE's solvents and plasticizers to save them production time and to give their product the wanted appearance.

Among the chemicals from CARBIDE that are being used to provide penetration and color gradations in wood

stains are CARBITOL and CELLOSOLVE solvents, diacetone alcohol, diethylene glycol, ethylene glycol, and methanol. Sanding sealers include FLEXOL plasticizers, fast and medium boiling solvents, and latent solvents.

Special lacquers for hard, smooth finishes are formulated with CARBIDE's ketones, esters, alcohols, glycol-ethers, and FLEXOL plasticizers. All of these materials lend their individuality to the type of finish desired, whether for antiquing, bleaching, highlighting or overtoning.

Information about many solvents useful in furniture finishing can be obtained from CARBIDE's 6-page Solvent Selector. Check coupon for a copy.

**Tear out this coupon.** Check the boxes on which you'd like more information, and mail to Dept. H, Union Carbide Chemicals Company, 30 East 42nd Street, New York 17, N. Y.

☐ CELLOSIZE H-E-C. ☐ Alkylene Amines.  
☐ Solvent Selector.

Name \_\_\_\_\_  
Company \_\_\_\_\_  
Street \_\_\_\_\_  
City \_\_\_\_\_ Zone \_\_\_\_\_  
State \_\_\_\_\_

And remember, there is a CARBIDE sales office near you where you can obtain the services of a CARBIDE Technical Representative. His wide industry experience is backed by both extensive chemical training—and by Technical Specialists.

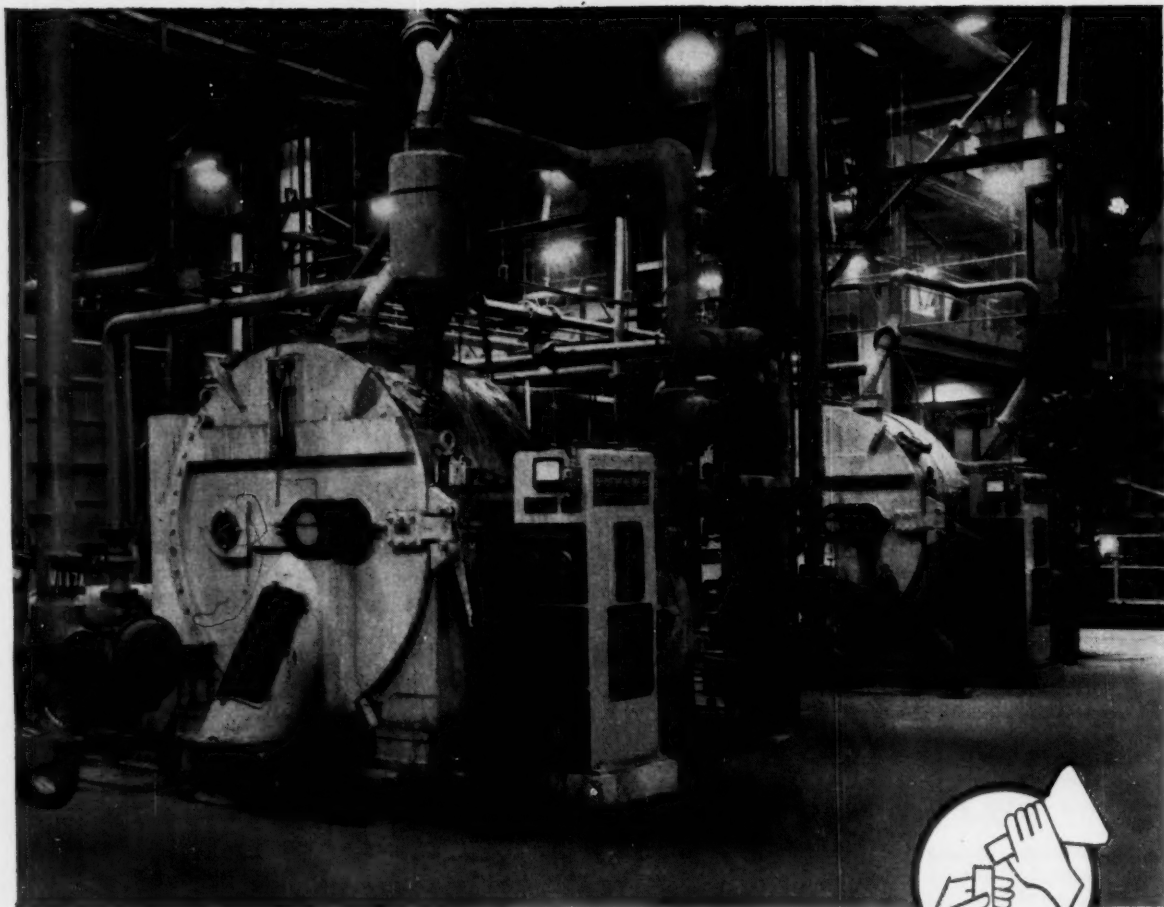
"Cellosize," "Carbitol," "Cellosolve," "Flexol," and "Union Carbide" are registered trademarks of Union Carbide Corporation.

UNION  
CARBIDE  
CHEMICALS  
COMPANY

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CORPORATION



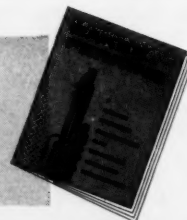
## B-P CENTRIFUGALS used by ELECTRO METALLURGICAL COMPANY in Titanium Production

Although a metal, titanium is produced by a chemical process. Metal in the form of ore is converted to titanium tetrachloride, which is purified and then reduced to metallic sponge by sodium. In order to separate the brine from the titanium sponge, Electro Metallurgical Company, Division of Union Carbide Corporation, New York, utilizes Baker Perkins 66" diameter type HS Universal Centrifugals. It's a tough application, but the B-P Type HS has proven itself efficient and dependable. These same machines are adaptable to a wide range of filterable fine solid-liquid slurries. Baker Perkins also manufactures type S Continuous Centrifugals which are used extensively for the separation of filterable coarse solid-liquid slurries.

Since centrifugation is such an important process in the

chemical industry, and, since there are so many types of slurries that must be separated, Baker Perkins engineers give special design consideration to each specific problem. No matter what factors are involved in each application, our engineers can make recommendations on the proper centrifugal machinery.

Send for your copy of Catalog  
CE-58 for complete information  
on size, type and capacities  
of Baker Perkins "Ter  
Meer" Centrifugals.



### BAKER PERKINS INC.

CHEMICAL MACHINERY DIVISION  
SAGINAW, MICHIGAN

361

# How Modern Is American Industry?

*A Report by the McGraw-Hill Department of Economics*

**THE U.S.A. is starting a new period of economic growth, as we leave behind the recession of 1958.** This new period presents a challenge to the nation, to the business community and above all to the individual company — to grow *at a profit*.

By now it is clear that growth is the normal way of life for the U.S. Economy. Since 1947, our national product has been growing at a rate of 3.7% a year. And no recession, even the latest and most publicized, has interrupted the trend for long. Now the economy is growing again.

**But the conditions of growth are far different from those that prevailed in the years 1947 to 1957.**

Today growth in the economy does not mean pressure on capacity, for most industrial firms. It does not mean easy profits. Rather, this is growth under highly competitive conditions, with profits dependent on a firm's ability to hold down costs. **Is our plant and equipment modern enough to do the job?**

## *A New Survey*

To find the answers to this question, the McGraw-Hill Department of Economics has just completed a special survey of business needs for modernization. **The survey shows that it would cost \$95 billion to replace today's obsolete equipment.** And this is a priority job, if business is to get costs down for the years ahead.

**This tremendous need for modernization presents a challenge to the U.S.A. as a nation.** The Communist powers are making a strong and disciplined effort to demonstrate that they can out-produce us — that they can "plow us under" in a contest of industrial strength.

**It is a challenge to American business.** Our people expect a continuously rising standard of living. Our workers expect wage increases. And often their demands mean price inflation — unless we can achieve sharp gains in output. The public demands higher national income without inflation. This is the challenge to business as a whole.

**It is a challenge to the individual firm.** Growth in the economy no longer means an automatic rise in sales and profits for any particular

to ensure our continuing superiority over the Communist world, to match every wage increase with higher productivity, to do business in a competitive economy at satisfactory profit to the individual firm.

This statement sounds shocking at a time when much industrial capacity is idle and the recession just behind us is being blamed on a surplus of capital goods. But the facts speak for themselves. Here is the record on the past decade of investment in new plant and equipment, and here is our

## THE MODERNIZATION JOB AHEAD: \$95 BILLION

The McGraw-Hill Department of Economics asked a wide sample of manufacturing companies, and experts in other industries, "What would be the cost to replace all obsolete facilities with the best new plant and equipment?" Here is a summary of the estimates. (Details on next page.)

MANUFACTURING AND MINING.....	\$34.3 Billion
PETROLEUM INDUSTRY .....	5.3
TRANSPORTATION AND COMMUNICATIONS....	18.4
ELECTRIC AND GAS UTILITIES.....	12.0
FINANCE, TRADE AND SERVICES.....	25.0
<b>TOTAL: ALL BUSINESS.....</b>	<b>\$95.0 Billion</b>

company. There are no shortages; industrial capacity is ample. So to participate in growth, the individual firm must achieve better quality or lower costs than its competitors. Otherwise, there will be no profit in growth and no success story for the company.

**Is business prepared today for these challenges? The answer, from our study, is clearly "No".** The production and distribution facilities of the U.S.A. are not efficient enough

new study of the job that still remains to be done.

## *Decade of Expansion<sup>1</sup>*

**Since 1947, private business in the U.S.A. has invested \$291 billion in new plant and equipment.** Our manufacturing capacity has increased about 80%; electric power capacity, 145%; capacity for basic raw mate-

<sup>1</sup> Figures on "Decade of Expansion" are for the years 1947-1957 inclusive, except where specific reference is made to preliminary data for 1958.



## THE McGRAW-HILL SURVEY OF MODERNIZATION NEEDS

Conducted by the McGraw-Hill  
Department of Economics in August, 1958

INDUSTRY:	AGE OF MANUFACTURING CAPACITY Percent Installed			COST TO REPLACE OBSOLETE FACILITIES Millions of \$
	Prior to Dec. 1945	Dec. 1945 to Dec. 1950	Dec. 1950 to Dec. 1957	
Iron and Steel.....	47%	16%	37%	2,855
Nonferrous Metals.....	47	13	40	1,022
Machinery.....	41	21	38	3,224
Electrical Machinery.....	34	18	48	1,917
Autos, Trucks and Parts.....	42	11	47	2,204
Transportation Equipment (aircraft, ships, railroad equipment).....	59	9	32	854
Other Metalworking.....	54	17	29	2,351
Chemicals.....	30	23	47	3,070
Paper and Pulp.....	49	17	34	2,655
Rubber.....	46	9	45	600
Stone, Clay and Glass.....	46	20	34	1,840
Petroleum Refining.....	45	26	29	1,499
Food and Beverages.....	58	19	23	3,443
Textiles.....	59	18	23	1,001
Misc. Manufacturing.....	51	21	28	6,236
ALL MANUFACTURING <sup>1</sup> .....	48	19	33	34,771

<sup>1</sup> Includes petroleum refinery companies listed under "petroleum industry" in previous table.

rials, by 55%. The distribution and service industries have increased floor space by roughly 50% in the decade. In 1957 alone, business spent \$37 billion on new plants and equipment — more than the combined expenditure in all of Western Europe plus Canada.

But all of this expenditure has not made our facilities as modern as supposed, or as modern as we need. Of the \$291 billion invested by business since 1947, roughly \$157 billion has been for expansion of capacity. Only \$134 billion has been spent to replace old facilities with better, more modern equipment. And in recent years, this investment has not purchased as much new equipment as the dollar figures suggest, because prices of capital goods have climbed.

Our postwar capital investment has repaired the worst of the obsolescence accumulated during the depres-

sion and war years. But huge amounts of old equipment are still in use, as shown by the table above. This is based on a survey of the age of manufacturing capacity in several hundred companies, representing all of the major manufacturing industries. Almost 50% of our present capacity was installed before or during World War II. More than 65% was installed before Korea. Expert studies of the major non-manufacturing industries show that the age of equipment, in those industries, is even greater.

**Thus, of all business plant and equipment, less than one-third is modern in the sense of "new" since 1950; two-thirds is pre-Korea.**

This over-all figure is confirmed by a check on specific industries:

- Nearly two-thirds of our metal-working equipment was installed over 10 years ago, according to preliminary results of AMERICAN MACHINIST'S 1958 census.

- Over 65% of the freight cars on our railroads are more than 10 years old.

- Less than half the capacity to process chemicals, rubber or petroleum is new since 1950 — a period that has seen rapid development in such equipment as automatic controls for these process industries.

These examples take on a dollars-and-cents meaning when we recognize that the latest machine tools are about 40% more productive than 1948 models, and that a combination of new freight cars and modern freight yard equipment can reduce operating costs up to 50%. New instruments, that automatically direct the flow of a chemical (or other raw material) process, can often reduce processing costs enough to pay back the cost of the instruments in one year. These savings cannot be made in older plants. By using obsolete facilities, our industries accept a waste in labor and materials that totals many billions of dollars per year.

### Why Productivity Must Rise

The U.S.A. can ill afford this waste. In the economic struggle between the free world and Communist world, our margin of superiority depends on the efficiency of our productive facilities.

**For the growth of our own economy, we shall need a sharp rise in productive efficiency. During the next ten years, American business must provide the goods and services required for a population that will increase by 32 million. And the increased population will expect higher living standards. Furthermore, the population in ten years will include a higher proportion of dependent persons — children and retired people — and a smaller proportion of working age men. Thus, with a relatively smaller labor force, industry must provide more goods for more consumers.**

**At the same time, industry must strive to hold the line against rising costs. In an economy with a tight**



labor supply, we cannot count on restraint in wage demands, however desirable such a development might be. In the past ten years, hourly wage rates have increased over 5% per year, nearly twice as fast as output per manhour. And this disparity may well continue—causing still more inflation—unless we make more rapid gains in productivity.

**We can make these rapid gains — if industry goes all out to modernize its equipment.** Output per manhour (in manufacturing) has increased only 2.5% per year since 1951. But this compares with gains of 4% a year in 1947-1950, and over 5% in the 1920s. Today the machines and techniques are available for us to equal, or exceed, these records — to raise output per manhour at least 5% per year. This is a job that can, and indeed must be done, to assure growth in the economy without inflation.

### **The Job Ahead**

The dimensions of this opportunity are shown by the table on the previous page. In its survey on the need for modernization, the McGraw-Hill Department of Economics asked a wide sample of manufacturing companies how much it would cost to replace *all* their out-dated facilities with the best new equipment available. The Department also interviewed experts in each of the non-manufacturing industries, to find answers to this question. The answers add up to a staggering bill for new plant and equipment.

**Modernization of over-age facilities — replacing only what is really obsolete, by today's production standards — would require a total capital investment of \$95 billion, or nearly \$20 billion per year for the next 5 years.**

Furthermore, new production techniques will soon make *today's* plants obsolete, in many cases. Thus, to keep pace with technical advance *from 1958 on*, will require continuing expenditures of \$8 to \$10 billion per year for modernization.<sup>1</sup>

The total expenditure to wipe out the backlog of obsolete facilities, and

keep up with continuing technical advance between now and 1963, would be at least \$135 billion.

The U.S.A. has never spent such a sum on the modernization of industrial facilities. Capital expenditures of boom dimension have, in the past, been associated only with the urgent expansion of capacity. **Some forecasters are now saying that because industrial capacity is adequate, the next few years will be a period of low capital investment. The figures above make clear that this would be a national calamity.** The opportunity is there—and the challenge—to invest record amounts of capital in the modernization of plant and equipment.

### **A National Problem**

**This also is a challenge to the U.S.A. as a nation. For 100 years, this nation has been looked to as the model of economic development by the rest of the world. For the first time, we face a serious challenge by another nation and another economic system that claims to be better.** In a carefully documented 111 page study released in May, the U.S. State Department declared that "the most serious threat" to the U.S.A. today is the drive for economic supremacy by the Soviet Union.<sup>2</sup> Although a much smaller nation industrially than the U.S.A., the U.S.S.R. is today increasing its national output at a rate of 7% per year and its output per manhour by 4% per year.

The U.S.A. does not have to match these specific figures, which represent the results of forced labor in a country just starting to develop industrially. In the contest to win uncommitted nations, the statistics are not likely to be quoted exactly, in any case. But our over-all growth in national output and living standards must be so impressive as to leave no question of superiority. Our factories must be showplaces of modernization to the foreign visitor that will leave him unable to say "I saw much better" in Britain, or West Germany, or Russia.

This is the challenge to the nation

—a political challenge to be sure. But it coincides with the challenge to the business community and the individual firm. And the way to meet it is the same: by thorough and rapid modernization of our plant and equipment — not by the slow and steady pace of recent years, but at an accelerated rate that reflects the greater pressure for output at lower cost.

### **Obstacles To Be Overcome**

**We must face up to the fact that real obstacles — both technical and financial—stand in the way of faster modernization.** Some companies do not have the technical "know-how" required for the latest production techniques. Many more lack the financial resources. How can we overcome such obstacles, and speed up the replacement of old facilities?

In the course of its study, the Department of Economics obtained comments on these questions from many executives. One of the problems, as we noted above, has been the urgent pressure to expand capacity during most of the postwar period. In giving their attention to this problem, companies have sometimes overlooked the chance to modernize older plants.

**In some cases, equipment has been kept in place because it was satisfactory, and the users were not aware of still newer designs.** Some equipment users believe that equipment makers are not sufficiently aggressive in designing and demonstrating new models.

**The biggest obstacle — and one that presents a persistent problem — is the shortage of funds in many companies that need and want to modernize.** For all corporations, the cash flow from retained earnings and depreciation has increased by more than \$5 billion from 1953 to 1958. But a number of key indus-

<sup>1</sup>This estimate is based on technical developments reported by McGraw-Hill editors and current price trends for capital goods. It is consistent with the plans for modernization expenditures in 1958-61 reported by companies in a McGraw-Hill survey conducted in April, 1958.

<sup>2</sup>"The Sino-Soviet Economic Offensive in the Less Developed Countries" — U.S. Department of State, May, 1958.

## MODERNIZATION PAYS

Profits on modernization—like all business profits—have come down since 1955. However, modernization, in contrast to new capacity, still offers a relatively quick return on investment. Here are companies' answers to the question: "In cases where you are actually replacing old facilities with new plant and equipment in 1958—how soon do you expect these replacement expenditures to pay off?"

### PERCENT OF COMPANIES ANSWERING

INDUSTRY:	1 to 2 yrs.	3 to 5 yrs.	6 to 8 yrs.	9 yrs. and over
Iron and Steel.....	11%	56%	11%	22%
Nonferrous Metals.....	29	71	0	0
Machinery.....	12	56	12	20
Electrical Machinery.....	29	57	7	7
Autos, Trucks and Parts.....	40	60	0	0
Transportation Equipment (aircraft, ships, railroad equipment).....	7	53	20	20
Other Metalworking.....	38	33	10	19
Chemicals.....	10	53	21	16
Paper and Pulp.....	22	22	22	34
Rubber.....	33	33	34	0
Stone, Clay and Glass.....	0	57	36	7
Petroleum Refining.....	16	50	17	17
Food and Beverages.....	16	44	12	28
Textiles.....	37	47	5	11
Misc. Manufacturing.....	9	52	13	26
ALL MANUFACTURING*.....	18	50	14	18

\*Note: Answers to a similar question, in a 1955 McGraw-Hill survey, were as follows: 1-2 years: 17%, 3-5 years: 64%, 6-8 years: 11%, 9 years or more: 8%.

tries have failed to keep pace with the general trend. These include some of the areas where the need for modernization is most urgent: the railroads, large sections of the textile industry, some mining industries and many small to medium-size companies in manufacturing generally. The problem of these industries and companies has grown more acute in 1958—since their profits have declined much more than the average for all business.

Any plan to step up the pace of modernization generally must deal with the special situation in these problem areas. Depressed industries and companies need outside help, if they are to modernize. Such help would include a stronger flow of technical information and advice (and occasionally, venture capital) from the more prosperous, inventive industries—as well as advice from

equipment suppliers and distributors, industrial publishers and consultants. There is also a public responsibility to help in the problem areas—not with handouts of government money, but with technical assistance and help in finding private capital (like the efforts now being pursued by the Small Business Administration).

Certainly we should lose no time in reforming those provisions of the federal tax laws that now impede investment in modern equipment by hard-pressed firms—especially the outmoded and unfair restrictions on rates of depreciation for tax purposes. At present, the tax regulations require that depreciation be computed over relatively long periods of "useful life" for most types of equipment. And this is a primary reason for the lag in modernization. Machinery generally

becomes obsolete long before the expiration of its "useful life" as specified in tax regulations. But it is difficult for companies—especially small companies—to set aside cash for rapid replacement, unless the full amount to be set aside is exempt from income tax. Canada and most European nations allow more rapid depreciation for tax purposes than does the United States.

A combination of self-help with technical help, and a fair break from the tax laws, would do much to reverse the spreading tide of obsolescence in depressed industries, and in many small companies.

## PLAN '59

It is this combination that McGraw-Hill advocates as "PLAN '59", to help business modernize now for growth and profits. This is what it will take to make a start in 1959 on the \$95 billion job of modernization, disclosed by the study we have just completed:

1. A better flow of technical information on where and how to modernize business plants and equipment.

2. Careful review by the individual company of its own opportunities to modernize at a profit—then action to replace obsolete facilities.

3. Reform of the tax laws, to allow more realistic deductions for depreciation, and permit more companies to finance adequate modernization programs from this source of funds.

Much of this program is already underway. The 34 McGraw-Hill Publications, and many suppliers and distributors of industrial equipment, have stepped up their information programs to start the modernization drive. Preliminary plans of manufacturing companies show a strong emphasis on capital spending for this purpose. In August, Congress passed a bill providing limited tax relief for small business.

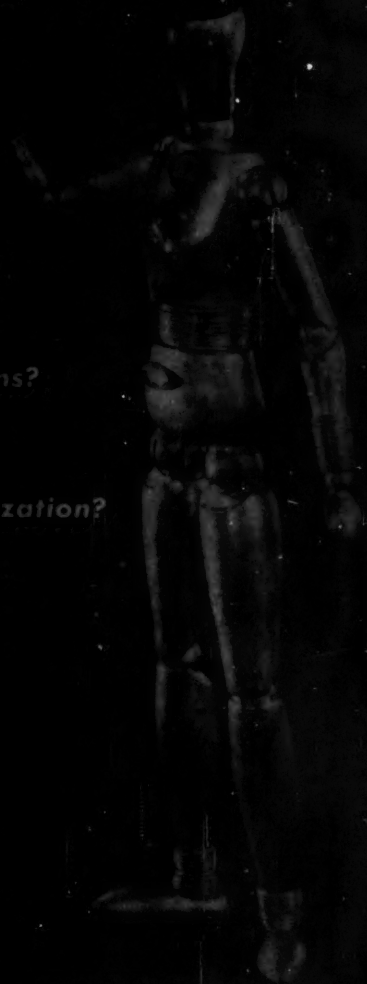
But the real task of modernization still lies ahead. It is the greatest challenge, and the greatest opportunity, confronting American business as we move forward into 1959.

# PLAN 59

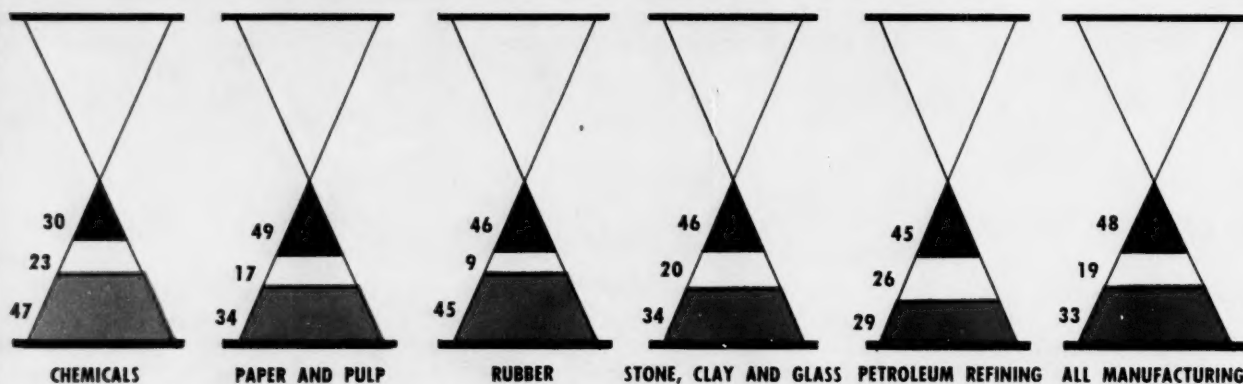
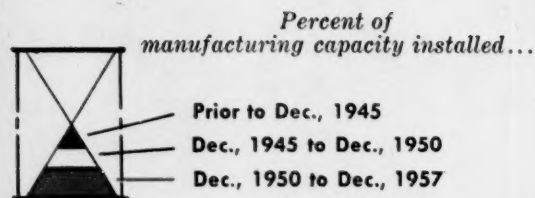
## MODERNIZATION for the CPI

**These are the questions—**  
the answers will help you turn today's problems  
into tomorrow's profits.

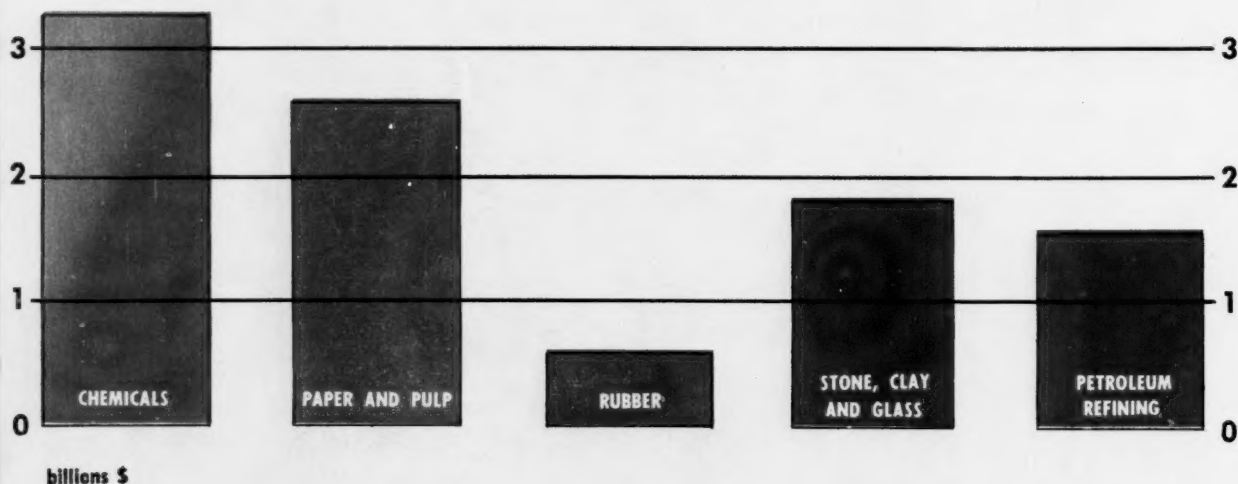
- 1 Why is there a modernization problem in the CPI?
- 2 Why should a company modernize its facilities?
- 3 Why should a company modernize now?
- 4 What activities should a company modernize?
- 5 How have companies handled specific problems?
- 6 How should a company organize for modernization?



## How Old Are Their Plants and Equipment?



## How Much It Would Cost Them To Replace Obsolete Facilities



PHOTOGRAPHY—McGRAW-HILL STUDIO



# 1. Problem: Overnight Obsolescence

The charts on the left give at once an accurate and misleading picture of the modernization problem in the chemical process industries.

Take the figures on the age of facilities. Companies in the chemical process industries indicate that, on the average, 41% of the capacity that was in place by the end of '57 was built prior to, and during, World War II; and 21% was built between the end of the war and the start of the Korean War. Only a little less than 40% was installed between Dec. '50 and Dec. '57. Over-all, then, this capacity is considerably younger than that of U.S. manufacturing industries as a whole; two-thirds of the latter's existing capacity was installed before Dec. '50. In these terms, the most modern industries are those making drugs and industrial chemicals. Only one-fourth of their total stock of plant and equipment was installed before the end of World War II. (This doesn't mean that all segments of the chemical process industries are that youthful. Makers of fertilizers, paints, explosives, paper, cement, glass and petroleum products report that two-thirds of their capacity was built prior to Dec. '50.)

Industries whose facilities are so relatively new would be expected to have a rather modest modernization tab. On the contrary, chemical process firms report that, if they were to modernize all their obsolete facilities, they would have to ante up \$9.7 billion. This amounts to 28% of the total U.S. manufacturing industries' modernization bill of \$34.8 billion.

**Competition Key:** The explanation of this apparent anomaly lies in the very nature of the chemical process industries: being growth industries, even their newest plants become obsolete in a relatively short time.

This is, of course, an old story in the chemical industry itself. Says James Haley, vice-president and general manager of traffic and trans-

portation for Koppers: "They used to say, during the war, that a plant was obsolescent as soon as it was finished. Now, it seems, it becomes obsolescent even before it moves off the drawing boards." B. B. Carr, director of planning for Callery Chemical, and M. W. Robinson, chief engineer for the firm, substantiate that. Callery's main business, right now, is the production of the brand-new, much-publicized, high-energy boron fuels. But both men already are concerned with modernization. They know that within two to five years present fuels will be inadequate and they will have to modernize to remain in business.

Alert to possibilities of overnight obsolescence, chemical companies devote much effort to keeping their plants modern. Dow, for instance, estimates that modernizations make up 65% of all projects involving capital spending in well-established plants. Modernizations, moreover, account for 25% of the dollar outlay and an even bigger share of the firm's design engineering effort.

But, by and large, chemical companies over the past decade have been stressing expansion and paying less attention to modernization.

Indications are that modernization is now coming in for more attention. Chemical industry plans for this year called for the spending of 72% of capital outlay for expansion, 28% for replacement and modernization.

For 1959-61, 68% of capital expenditures is earmarked for expansion, 32% for replacement and modernization.

Du Pont emphatically points out that modernization is a continuing program in chemical plants. Yet, this year, it is putting a whopping 80% of its total capital outlay into modernization or expansion of existing facilities. This is necessary, Du Pont says, to keep pace with rapidly changing technology. It adds that its engineers frequently design a whole proc-

ess, knowing full well that its life expectancy doesn't exceed a few years.

**Pushing Productivity:** Another reason why modernization will get increased attention for at least the next few years: according to latest plans, the CPI expects to boost total '61 capacity 19% over '58's. Without adding to national inflation and while maintaining a profit, this can be carried out only by increasing the productivity of the labor force. And that means modernization.

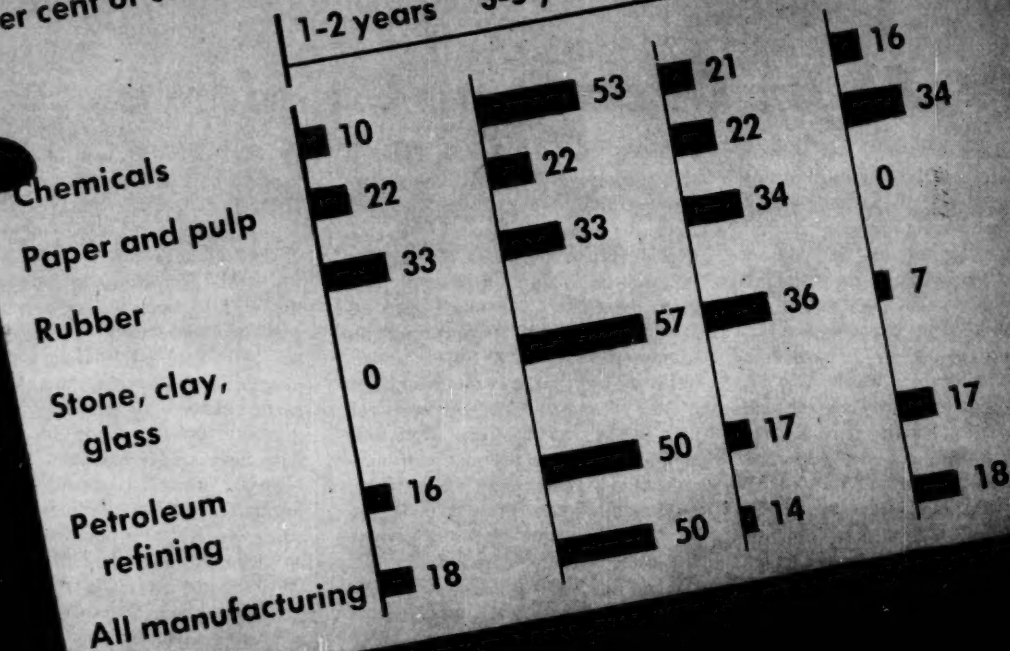
So far, chemical industry can take justifiable pride in its record on that score. No official productivity indexes are determined for the CPI. But using the Federal Reserve Board's index of production of chemicals and allied products and Bureau of Labor Statistics data on production workers and their average hours of work as an input, statisticians estimate that productivity in the chemicals and allied products industry has risen 84% since '47—a rate of 6.3% year.

Wage rates for the industry aren't available either. But Bureau of Labor Statistics data indicate gross hourly earnings (including overtime) of chemical production workers have risen from \$1.232/hour in '47 to \$2.22/hour in '57—an 80% gain or an average of 6% year, about the same as the productivity gain.

This chemical industry record stands in sharp contrast with that for all manufacturing, wherein productivity has just not been able to keep pace with rising labor costs. Since '47, wages in manufacturing have risen 68%; increase in output per manhour has gone up a mere 32%.

The chemical industry, however, has been able to push productivity only by constant vigilance, by quick adoption of new techniques and tools. Consensus: now is no time for complacency; the real test is yet to come. The chemical industry has already run up a \$3.07-billion modernization bill to back this contention.

Per cent of companies expecting payout in . . .



## 2. Why Modernize? Figure the Return

The unwary could easily jump to the wrong conclusion from the figures above, part of a just-completed survey. Here's why: 68% of all manufacturing companies expect to pay off their modernization expenditures in less than five years. Oddly enough, not one of the five segments of the process industries pay them out that soon. Apparent conclusion: either the process industries are accustomed to longer payoffs than other industries or they use a measure for determining modernization expenditures that differs from that used to determine expansion expenditures.

Actually, of course, on payouts, the process industries are considerably faster than the industrial average. Neither is the alternate conclusion—that they use a different yardstick—quite right. Most companies spend money for modernization or expansion only when they can be fairly certain of attaining a fixed payoff or return on investment. But there are compelling competitive reasons why they have to modernize and settle for less.

**Return's the Thing:** All other things being equal, chemical companies insist that a capital expenditure

for modernization earn the same return as an expenditure for expansion. Allied works that way. So do Dow and Du Pont.

W. J. McLeod, manager of the processing division of Standard Oil of California, says: "We do not replace refinery equipment as a matter of pride but as economic justification occurs."

It isn't unusual, however, for a firm to lower its standards of return if the project involves a sizable labor-saving. This, of course, is merely putting the return on a broader basis because of the speed with which labor costs rise.

There are other justifications, too. Macauley Whiting, manager of service departments for Dow's Midland Division, lists better customer service as a potent reason for modernizing. Kaiser Aluminum & Chemical feels that safety, housekeeping and working conditions are important. Pittsburgh Coke & Chemical's chief engineer John Mayers nominates product quality, customer service, operational safety and housekeeping. Arthur Larson, manager of process engineering for Hercules, mentions quality of product and economy.

### **3. Do It Now: It's Cheaper, Quicker**

From opposite coasts last week, a financial executive and a production manager looked at this question: When to modernize? For somewhat different reasons, they arrived at the same conclusion: Now is the time.

- In New York City, Frank Linton, vice-president and comptroller for Allied Chemical sees it this way: "Whether you're building a new plant or revamping an old one, you need an economic justification. Because you can get a pretty good buy in construction right now, it's somewhat easier [right now] to find that justification."

- In San Francisco, Max Spealman, Western production manager for Stauffer Chemical Co., sums up his feelings as follows: "There's no question but that it's cheaper and quicker to modernize now. What's more, you may be able to afford the downtime now. If capacity is running ahead of production, you can run the plant at capacity for a few months to build up inventory. Then, you can shut down to make necessary—and in some cases long-delayed—modernization improvements."

**Building for Tomorrow:** Elsewhere on both coasts and at all points in between, executives of chemical process firms, engineering-contractors and equipment suppliers are in substantial agreement. Consensus: it's possible to save 5-10% on building costs and two to six months' time on a major construction project.

James Gillet, assistant to the president of Victor Chemical, finds a "buyer's market in darn near everything. It is well worth taking advantage of," he con-

cludes. "We may not see such times for a long while to come. It is a time to build, even overbuild in anticipation of requirements a few years from now."

H. W. Spaght, vice-president and plant manager for National Aluminate, like most production men, feels modernization should not be confined to times of unfavorable business conditions. He points out that National Aluminate has been actively modernizing its facilities for the past 10 years. But he also feels that modernization in a slow business climate has some clear-cut advantages. "When you're not pushed for production and when equipment is idle anyway, you have an opportunity to shut down and modernize without paying a heavy penalty in lost sales. Just a year ago, we had to be hard-pressed to interrupt production for projects of that nature."

John Mayers, chief engineer for Pittsburgh Coke & Chemical, answers the question this way: "The only way to stay in business is to modernize. But there are some extra factors that make 'now' a particularly good time. Money is available and the material and labor situation is favorable."

Says Peter Marshall, chief engineer for Abbott Laboratories, "All our modernization projects are based on long-range planning, formulated as much as five years in advance. We review these every six months and although we would never delay projects in anticipation of more favorable purchasing conditions, we might very well move them forward for that reason. And there's no question that such favorable conditions exist

Construction time  
and cost estimates  
are at a low.

today. This is an excellent time to be building and modernizing, if it ties in with your company's long-range planning."

Sidney Bresler, supervisory engineer with Chemical Construction, is also a firm believer in modernizing during periods of business decline. Says he: "Periods of generally static economy offer rare opportunities for carrying out a warranted modernization program. Because others may not be purchasing, delivery time for most equipment is reduced. Frequently, by careful procurement, equipment can be obtained at discounted prices. Even the state of the capital market is not disadvantageous. Although financing may be difficult to arrange, it is at low interest rates."

**Not Unanimous:** But the feeling that now is the time to modernize is not unanimous. Hooker Chemical, for one, takes issue: "Our engineers can't find those 5-20% lower costs. Perhaps it would be more accurate to say that costs haven't risen that much because of the recession. We are carrying out several modernization programs now. But our feeling is that modernization should be done whenever the justification, for one reason or another, is strong enough. It should not be done primarily to take advantage of recession situations."

American Marietta (Seattle, Wash.) has just broken ground on a proposed \$1-million research lab. But it says this has nothing to do with the recession, feels that ups or downs in the economy should not affect timing on new research facilities.

Monsanto echoes Hooker's feelings, too. "We do not agree that building costs, as related to the chemical industry, are lower," a company spokesman says. "Rather there is somewhat of a leveling off, with a probable increase in the future. So it would be better to build this year rather than next year. But the same statement could have been made in past years and probably in future years, too."

**Area of Agreement:** Even behind these apparent differences of opinion, however, there's a solid area of agreement. Nobody, for instance, is proposing that a project should be undertaken merely because it can be done cheaply. Proponents of do-it-now, for the most part, argue that it may now be possible to justify some marginal projects.

Imagine, for example, a company whose yardstick for capital expenditures is that the project must earn an annual 20% return on the investment. A \$1-million project proposed last year did not qualify because the savings were \$180,000/year—an 18% return. Suppose further that this year the savings would be the same but the project could be done for 10% less money, \$900,000. It would then earn the necessary 20%. Even if the capital savings were only 5%, other factors might bring it up for serious consideration. These might include deterioration of existing facilities or the possibility that future modernization might be difficult because of heavy downtime.

This is what Pittsburgh Coke's Mayers has in mind when he says: "We still consider the possibilities of return on investment. But a project that shows only marginal returns could possibly be more attractive now."

Adds Jack Schumann, sales manager for Vitro Engineering Co.: "Now is the time to get the most for your modernization dollar. But that doesn't mean that everyone should modernize. Never modernize just for the sake of modernization. Your present operation may be the best one for you. The way to find out is through a full evaluation by a team of experienced engineers."

**Case for Costs:** Du Pont's construction experience pretty much reflects that of Hooker and Monsanto. And Du Pont stresses that modernization is a continuing program, not one that should be emphasized during recessions. However, the company's chief engineer, Granville Read, concedes an advantage in doing it now: "Drink at the brook when it's not too crowded. The water is clearer and you can enjoy it more."

Most management men agree that the "brook" is not crowded right now. Costs consequently are lower than those of a year ago. James Curtis, president of Chemical Construction, estimates building costs are 6% lower. The firm figures a plant that formerly



Labor of all kinds  
is available,  
equipment deliveries  
are fast.



would have taken 13 months to finish can now be running in 10-11 months. Lummus estimates a 5% drop in costs, construction time reduced three to six months. Another big engineering firm, headquartered in the Midwest, brackets savings at 5-20%, timesaving at two to five months on a 12-15-month job. James Couch, manager of engineering for USI, estimates savings at 2-5%, feels it may be possible to shave one or two months off a 12-month project. Pittsburgh Coke's Mayers pegs costs at 10% lower than two years ago.

Abbott Labs' Marshall feels that a 5-10% break in building costs is the rule today. He cites the company's experience with its new employee health center, for which ground was broken last month in North Chicago. The architect's estimate on the building was \$205,000. Contractor bids ran about \$165,000. The estimate on the heating and plumbing system: \$8,600. Winning bid: approximately \$6,000. Breaks of this magnitude, however, are not the rule.

**Down to the Bone:** One big reason why construction costs are down is that engineering-contractors, eager for business, are cutting their bids to the bone. Says A. G. Petkus, engineering vice-president of Chicago's Procon: "When we sit down at the drawing board these days, we're working with a mighty sharp pencil.

There's a greater willingness to gamble on the low side of a bid and a tendency to work inside of tighter margins."

A New York firm has managed to cut its asking price by dropping its contingency fee. And such practices aren't unusual. Victor's Gillet reports, "It's possible to get really firm dollar bids from contractors." Formerly, he recalls, bids were "shot full of reservations and contingencies, and it was next to impossible to pin down what a job would finally cost."

E. S. Ladley, director of purchasing for Hercules, tells about a recent job. Its total cost was approximately \$50,000; six contractors bid on it. One was \$5,000 high but the rest were within \$500 of each other. "That probably means," he says, "that they were all eager for the work. The price was fair and we're getting high-class work."

Says Kenneth Wolfe, assistant chief estimator for Bechtel: "A sharpened bid is to the customer's benefit. But it has an over-all beneficial effect on us, too. To offer a lower bid and still earn a profit, we must continue to develop new and improved engineering and construction techniques. These are usually specific for each job."

**Top Talent:** A relatively slack business period for

engineering contractors gives the client another decided advantage. He can get a firm's top engineering talent working on a job. Moreover, he can get it working right away. "Better engineers and construction personnel are available for a project now," according to Dudley Field, of Ralph Parsons. "This makes for better plants, faster completions and resultant savings." Bechtel's Wolfe agrees.

And a top executive in a Houston construction firm says his company can start engineering within a week from the time it receives a letter of intent. "A year ago," he says, "it required a month to shuffle the men around to start the engineering. Three years ago, we were so busy it took us three months to get started."

**Productive Labor:** The same man points out that construction labor is freely available in the Houston area. His counterpart in the Midwest reports that "labor has never been so available, so cooperative, so reasonable. They don't ask for overtime or other gimmicks. Moreover, we can get experienced, skilled workers."

USI's Couch feels that labor productivity has improved decidedly. So does Bechtel's Wolfe. "Some crafts," Wolfe says, "are now completing jobs in 80 hours that formerly took 100 hours. We attribute this to the recession. A man puts out more if he knows jobs are tough to get." Pittsburgh Coke's Mayers estimates that labor costs—which make up 40% of construction costs—might be down as much as 10%.

**Easier Equipment:** Another important factor making for highly attractive construction costs and scheduling is the general availability of equipment. Here is how four buyers from Hercules Powder size up the equipment picture:

- Robert Bovard, heavy equipment: "Deliveries are quicker on small, standard items. But some vendors have reduced their inventories on parts for more complicated equipment. Even there, however, there may be a net reduction in delivery time because the maker may start processing the order right away."

- J. F. Ferguson, pipes, valves, fittings, etc.: "Alloys get a little rough. But deliveries in general are good. You can save some money on valves and fittings. It depends, of course, on the quantity you take."

- Jack Talbot, instrumentation buyer: "On some items, deliveries have been reduced materially. Complex electronic equipment delivery takes time because of military priorities. There have been some scattered price increases but, over-all, prices haven't changed much. If delivery is the major consideration, it's a good time to buy."

- C. F. Jones, pressure vessels: "Field-erected carbon-steel items arrive in four months instead of 18. Structural steel delivery is very good. Early in '56 and '57, delivery required two years. Now, it's down to six or seven months. Nickel, aluminum and some other metals are easier to get."

**Good to Excellent:** Around the rest of the country

there's near-unanimous agreement with the Hercules buyers. A plant manager of one of the biggest firms in Texas City says equipment deliveries are "good." A construction executive in the Southwest goes a step further, says they're "fabulous."

Another from the same area offers this time schedule: To assemble a coking unit in 1956-57 took 15 months; one can now be set up in 12 months—the same time it took in '54. It required 21 months in 1956-57 to put up an ethylene plant; it can be done now in 18 months—also the same schedule as in '54.

Procon's Petkus sums it up this way: "The chief bottleneck we've run into in the past has been the inability to get hold of reactors, columns, and the like, when we needed them. And it's darn hard to work around equipment like that." He figures deliveries on vessels and key equipment, such as compressors and pumps, are 30-35% quicker than they were two years ago.

Prices have held the line or increased slightly. But the smart shopper can pick up bargains in some items. Electrical equipment in particular is highly competitive and manufacturers are shaving their prices. "Most electrical companies," says R. L. Dhuy, Industrial Sales Dept. of Westinghouse, "have cut down on their backlog, can give details and good prices on request."

A Midwest company just completing an office building estimates that it saved \$12-13,000 on its electrical work. Some prices are off 30% or more, varying, of course, with the size of the order and the equipment that's involved.

It's possible to get discounts on other items, too. Bechtel reports it can buy permanent equipment, as well as valves, fittings, columns, for several percent less than it paid a year ago. A Chicago equipment company frankly admits it is willing to talk in terms of discounts up to 10%, when it wants to sew up a particularly attractive job.

Dorr-Oliver says prices have come down 5-8% since '56. Delivery time on stock items—pumps, centrifugals, wet cyclones—is now three weeks instead of the former 12 weeks; on custom items, 16 weeks instead of 32.

**Running Out:** There is widespread feeling that because business is picking up, the period of bargain building is fast running out. In the meantime, however, there remains the recession-sparked reluctance on the part of most companies to go into large building or modernization projects.

Walter Alexander, senior vice-president of Scientific Design, says: "All the arguments for cheaper building are meaningless unless you can get a firm prediction on future sales. Sales managers are understandably loath to make such predictions when business is declining." This, too, will undoubtedly change with the economic upturn. But even then, as Art Moss, head of all Carbide chemicals plants puts it, "You still have to have money in the till and a certain amount of courage."

## 4. What to Modernize for Most Payoff

Chances are that a chemical company's modernization dollar will earn its biggest return if it's wisely spent in one of the areas on the check-list (*right*). That, is the consensus of the country's top engineering, research and administrative talent queried by *CW* last week.

A comprehensive modernization program, of course, calls for a detailed study of each case. But, in general, the approach is this:

- If you want to expand production with a minimum capital investment, examine the major pieces of equipment for bottlenecks. "Usually," says Sidney Bresler, supervisory engineer for Chemical Construction, "there are costly key elements, whose capacity is the limiting factor. These may be compressors, autoclaves, distillation columns. The first step is to find these key elements and determine their full potential. It may be that small modifications of these would result in an increase in capacity entirely disproportionate to the cost involved. The next step is to analyze the minor elements to see which equipment can be modified or purchased to obtain the plant's full potential.

- If you're interested in reducing operating costs, look for the most costly operating items and then concentrate on them. "After all," says Jim Armstrong, director of management engineering for Allied, "it's merely applied common sense. There are no mysteries in this business."

**Down to Cases:** It's highly probable that the most costly operating items will be tied into the areas outlined in the check-list. Here are some of the technological trends that make them attractive for modernization investments:

**Process Change.** It might be that the basic process itself is at fault and that a process development program might bring handsome returns. Conversion of a batch process to a continuous one, for instance, can be what Macauley Whiting, manager of auxiliary services for Dow's Midland Division, calls the "biggest dollar-saver of all." Allied learned that recently when, by scrapping a worn-out batch plant and replacing it with a modern, continuous one, it was able to reduce its productive labor force by 30 men.

Often, such a change requires a considerable research effort. And such an effort should be made only when rewards are potentially big. Says A. T. Maasberg, director of research and development for Dow's Midland Division: "You must decide what processes are most important from the standpoint of present stature or growth potential. Then, you have to examine the competitive situation. Finally, you have to decide what sort of improvements are possible. And that's where judgment comes into real sharp focus."

A change in process, however, needn't necessarily involve a big investment on research. Says Chemico's

### Where can your modernization dollar earn the biggest return?

#### Process Change

Switch from batch to continuous  
Use of alternate materials  
Catalyst change

#### Instrumentation

On-stream analyzers  
Console-type instruments  
Pressure, level, flow-rate controllers

#### Maintenance

Sturdier materials of construction  
Automatic tools for maintenance crew

#### Materials Handling

Unitized packages  
Automatic equipment (conveyors, etc.)

#### Utilities

Electrical equipment  
Steam studies  
Water utilization

#### Research

Automation of laboratory procedures

#### Sales

Integrated data processing

#### Administration

Communications  
Financial control  
Services



# PLAN 59

Bresler: "Sometimes it's possible to substitute a fluid having greater absorptive capacity than the one currently used. Thus, to increase carbon dioxide absorption, an MEA (monoethanolamine) absorber may replace a water scrubbing tower. Or, if regenerative heat is a critical factor, the MEA may be replaced with hot potassium carbonate solution."

Occasionally, a different raw material — either cheaper or purer—may be quite profitably substituted. Or, putting in a longer-lived or more reactive catalyst might bring startling results. "That may be the cheapest modernization of all—requiring little or no capital investment," says Al Saffer, assistant vice-president, research and development, Scientific Design. "It may even give you a minus payout," agrees Henry Peters, engineering vice-president for SD.

**Instrumentation.** Rising labor costs and the development of new and more reliable instruments have teamed up to make instrumentation one of the most fertile fields for modernization investment.

Better product quality is often an important result of instrumentation modernization. A plant manager in the Southwest sees that factor as bulking even bigger than reduction of operating costs. He also sees a big future for process control instruments as replacements for the control lab.

In fact, onstream analyzers are mentioned as likely instrumentation investments more frequently than is any other single category. But they have company. Ed Fox, vice-president of Union Carbide Development, for instance, nominates onstream analyzers but also thinks highly of console-type instruments. These permit a single operator to control a whole battery of producing units. The chief engineer of a big chemical plant sees a lot of sense in the use of electronic computers to help optimize operating conditions for greater efficiency.

Chemico's Bresler thinks highly of onstream analyzers but also feels that level control valves, pressure- and flow-rate controllers are important. "With the installation of attendant alarm systems," he says, "the operator is freed from a number of routine adjustments and can oversee a larger section of the plant."

But although improved instrumentation should come up for consideration in any major modernization program, it isn't the easy road to profits. In fact, instrumentation modernization might be harder to justify

than some other types, particularly if it involves whole new systems (unless tied to other changes in the process or equipment). Reasons: most chemical process plants are highly instrumented to begin with. Operating cost savings from the additional investment might be offset by higher cost of maintaining the new instruments. New instruments, moreover, frequently cost considerably more than the ones they replace. And although they may be more sensitive or provide greater accuracy, it may be difficult to exploit these characteristics without a concomitant improvement in control methods.

**Maintenance.** Attacks on high maintenance costs in the chemical process industries are mounting from two directions: sturdier materials of construction and protective coatings, and improved tools to boost the productivity of maintenance crews.

Use of better materials includes substitution of new pieces of equipment. An engineer in a big chemical plant, for example, suggests that a likely area for modernization is in the replacement of reciprocating compressors with turbo compressors. The latter, he says, are initially less costly, and are more economical to operate. In addition, he says, they have fewer parts, are therefore more economical to maintain.

A colleague in the Southwest wholeheartedly agrees with this. He points out that newer materials not only may last longer but also may help alleviate the cleaning problem. "Much can be done," he says, "to modernize the plant by installation of new equipment, especially some of the newer types of pumps. We have recently substituted glass-lined steel pipe for straight steel. It has reduced the cleaning job tremendously. We have also used some Pyrex piping, with fine results—the glass surface prevents the material from sticking to the inside of the lines."

Dow's Whiting goes along with the use of stainless, glass-lined or clad equipment to reduce maintenance costs. He reports, for example, that Dow is now putting copper-coated steel tubing (instead of plain steel) in condensers whenever replacement is necessary. Reason: to reduce fouling.

Paul des Jardins, manager of the product and marketing planning department at Worthington Corp., says that it may not be necessary to substitute complete items of equipment. It is possible, he says, to achieve substantial savings in maintenance by putting longer-lived parts in existing equipment. Says he: "You'd be surprised how many people are overlooking the little things, using bronze and cast iron impeller rings that have to be replaced frequently, say every 10 or 11 months. Equipment such as small centrifugal pumps are fairly well standardized today, and it would be a simple job to replace the fast-wearing parts with stainless or other metal. They'd save themselves a lot of headaches and a pocketful of money in the long run."

The other approach to the maintenance problem, a better equipped maintenance force, is also paying off



big for some firms. Carbide Development's Fox, for instance, points out that tearing down a distillation column for cleaning is immeasurably easier as a result of using impact wrenches. "Traveling cranes, automatic ditch-diggers and other new equipment are giving the maintenance worker more horsepower. Moreover, more attention is being given to designing the plant with a view toward simpler maintenance," he says.

A big help to Charles Oren, manager of maintenance for Dow's Midland Division, and his crew have been hydraulically operating working platforms (e.g., the Giraffe). "Using those for a painting job," he says, "you can have the job finished before you could have built the scaffolding for it." Portable aluminum scaffolding and platforms that can be operated either electrically or pneumatically (the Spider) have also proved useful.

R. C. Woodbury, assistant manager of the division, credits automatic welding equipment, a portable X-ray machine, and an air-driven hack saw adapted to handle bundles (instead of a single piece of pipe) with having increased productivity. "When you get used to these things," says Oren, pensively, "you wonder how you ever got along without them."

Oren and Woodbury agree that, although the new tools have helped a lot, they have made planning more necessary than ever. For instance, Dow purchased a Warner & Swasey machine. "Now, instead of making two or three pump shafts," says Oren, "we'll turn out a whole slew of them. But that means we have to have a darn good idea of how many we'll need in the foreseeable future."

**Materials Handling.** One of the big trends in materials handling is the unitized concept, hybrid bulk-package containers such as Sealdbins and Tote Bins. Gordon Anderson, traffic manager for Dow's Midland Division, expects greater use of such containers in export packaging, too. They offer sizable labor savings, of course. "In addition," he says, "they permit the ship to be loaded much faster. This is important because it costs almost as much to tie a ship up as it does to run it. They do involve some loss of tonnage because they don't conform to the ship's contours as well as a smaller package would. But that's more than offset by the other savings."

Chemical process companies have been quick to adopt palletizing, fork trucks, conveyors and other modern aids to materials handling. For the past 12 years, Dow, for example, has been doubling its use of fork trucks every three years. This trend will grow; the industry has found investments in such equipment to be highly profitable. A key engineer in a big company points to a new trend: use of instrumentation to control materials-handling equipment.

**Utilities.** "Du Pont has found that it's possible to make significant reductions in the consumption of water, electricity and steam by a concerted plantwide drive," says Gilbert Church, staff assistant in Du Pont's engineering department. Few engineers disagree with the effectiveness of this approach.

There's widespread agreement, too, that most chemical companies could profitably examine and overhaul their electrical supply and distribution facilities. Many of these were installed for much smaller plants; con-

**'Much can be done by installation of new equipment, especially some of the newer types of pumps.'**



sequently, inefficiencies and losses have mounted as the plant and electrical needs have grown. "Chemical process firms," says a senior engineer in a large electrical supply firm, "have been lax in keeping their electrical facilities up to date. This applies to all their distribution facilities and planning for expansion. If they are not actually underpowered today, they're precious close to it. In another economic upsurge, they'd be hard put to modernize their electrical systems in time."

A study of steam utilization can turn up dramatic savings. Says Arthur Larson, manager of process engineering for Hercules: "It's not unheard of for a steam study to net savings equivalent to the capital cost of the plant in the first year." Such a study at Hercules' Savannah plant is bringing in savings this year at an annual rate of \$27,000. Of this, \$20,000 will be steam savings; \$7,000 in electricity. In putting in a more modern installation at one site, Allied installed a triple-effect evaporator that cut steam consumption approximately 50%. It permitted elimination of a costly power-house operation. Annual savings: \$60,000.

**Research.** Rising labor costs are squeezing research as well as boosting production expense. It now costs twice as much to support a technical man in a lab as it did 10 years ago. Research administrators are coming up with the same answer as their counterparts in production: automation.

"The solution of this problem," says R. H. Boundy, vice-president and director of research for Dow, "... is to increase the productivity of research at a rate greater than that of increasing costs. . . . If in place of taking samples and waiting days for analytical results, we can automate the extensive data-taking stage of research, it will be possible to speed up this part of the work by a factor of 10."

J. O. Bengston, of the Chicago Apparatus Co., also sees a trend toward more automation in labs. He points out that total lab equipment sales hit \$295 million last year, of which 60% went to industry, the remainder to schools. And sales for the first quarter of this year were up 10%. This, he feels, is a perfect barometer of continued expansion and modernization of industrial research.

The same onstream analyzers that are having such an impact on production planning are also helping out in the research lab. For, by freeing chemists from routine analytical work in control labs, they are freeing them for more creative tasks in development and research.

**Sales.** Handling of sales data is a potentially rewarding area for modernization. Integrated-data processing, for instance, is getting a big play (Olin Mathieson, Du Pont, General Chemical, Diamond Alkali, Shell Chemical, Carborundum). In this system, information that remains constant on a customer's recurrent orders is put on punch-tape. When new orders come

in, the tape is used to obtain constant data; the operator adds the variable data. This is usually hooked up with leased-wire transmission to plant and warehouse locations to speed communications. In transmitting orders, the standard-data tape is combined with variable data to make a new tape. This, in turn, can be used to produce tape and IBM cards for any number of other purposes (e.g., sales analysis). The big advantages of integrated data processing for sales are speed, accuracy, faster and more complete records and analysis. The system also cuts down on labor.

Sales and traffic managers are putting other modern administrative techniques and tools to good use. For instance, Koppers formerly spent as much as six weeks getting new sales estimates if a freight rate changed. Now, its traffic department borrows an IBM computer from the finance department, two men wire the machine, finish the job in a day.

**Administration.** There's considerable opinion that the administrative systems of chemical process companies are as potentially productive an area for modernization and streamlining as were process plants 10 or 15 years ago. Dow's Whiting, for one, sees "paper handling just as fertile a field for modernization as materials handling." James Haley, vice-president and general manager of traffic and transportation for Koppers, agrees: "My biggest modernization battle is against paper work. I'd like to free my people from putting scratches on paper as much as possible . . . give them more time to think."

In general, modernization of administrative procedures is taking place along three lines: communications, financial control, services. Communication modernization includes broader use of company transportation (airplanes, autos). It also takes in such installations as complex and flexible leased-wire equipment (sometimes hooked up to integrated-data processing), use of speedier routing (such as Du Pont's new private telephone exchange); improvement of secretarial systems (through use of electric typewriters, office computers, central stenographic pools, whereby dictation is phoned to the pool).

Efforts to secure better financial control are centering on the installation of new, improved and sometimes automated accounting procedures. The goal is to provide more complete information, faster. There's also an effort to determine the most effective use of computers in such systems.

Modernization of services concerns the re-evaluation of services performed by the company to decide whether they should be purchased. As an example, until recently, companies have built and operated their own cafeterias. Now, the trend is to provide heat, light, equipment, space and maintenance but to hire outside caterers to do the job on a contract basis. Hercules, for example, expects to save \$30,000/year at its Brunswick, Ga., plant by transferring lunchroom operation to a chain-restaurant operator.

RESEARCH

QUALITY  
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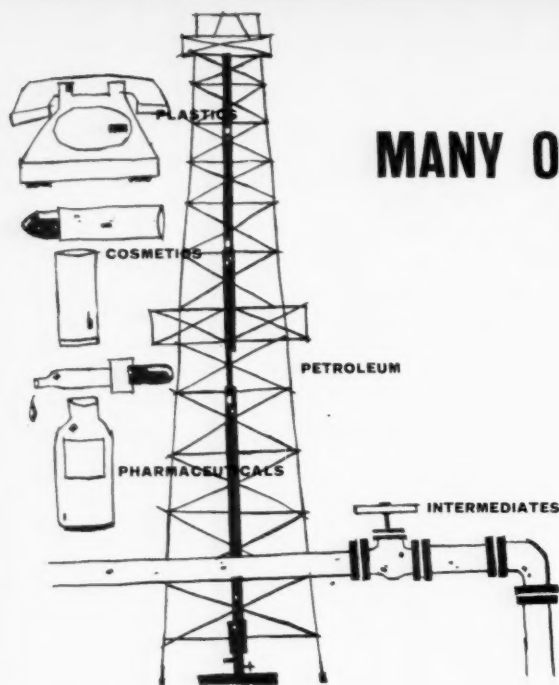
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Industrial Chemicals Section

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Whatever your needs, you can  
rely on their quality and  
dependable uniformity . . .

### ACIDS

#### ADIPIC ACID



Organic dibasic acid with minimum purity of 99.6%. White crystalline form.

*Applications:* Manufacture of adipic acid esters; used in rubber, plastics, petroleum, chemical and allied fields.

*Shipment:* 50-lb. multi-ply paper bags and 2,000-lb. "Pillar-Pack" bulk containers.

#### DIGLYCOLIC ACID



Dibasic acid completely soluble in water and lower alcohols. Reacts with alkalis to form acid and neutral salts; with alcohols to form esters; with ammonia to form the amide or the six-membered cyclic imide. White crystals.

*Applications:* manufacture of resins and plasticizers.

*Shipment:* 50-lb. multi-ply paper bags.

#### HYDROXYACETIC ACID



Relatively strong organic acid, miscible in all proportions with water and water-soluble organic solvents. Straw-colored liquid.

*Applications:* used in acid detergents, electropolishing and electroplating solutions, dyeing and tanning.

*Shipment:* tank cars and 55-gal. lined steel drums.

#### PROPIONIC ACID



An organic acid soluble in water, alcohol and most organic solvents.

*Applications:* used in the manufacture of cellulose propionate and mixed esters; in preparing plasticizers for cellulosic esters; in manufacture of ester solvents; and in fruit flavors and perfume bases.

*Shipment:* tank cars and 55-gal. drums.

### ALCOHOLS

#### METHANOL



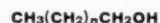
Highly versatile and reactive. Du Pont Methanol features dependable uniformity and a purity exceeding 99.85%. Clear, colorless liquid.

*Applications:* production of formaldehyde, pharmaceuti-

cals, methyl esters; extractant for animal and vegetable oils; ingredient in anti-freeze. Used as a solvent and as a racing fuel.

*Shipment:* tank cars, tank transports, tank wagons and 55-gal. drums. Available through your local Du Pont Chemical Distributor.

#### FATTY ALCOHOLS—"Lorol"



Straight-chain alcohols containing an even number of carbon atoms, ranging from C-8 (n-octyl) to C-18 (stearyl). Can be esterified with acids; oxidized to corresponding aldehydes and further oxidized to corresponding acids.

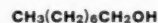
*Applications:* emulsifying and softening agents in cosmetics, salves and ointments; in manufacture of plasticizers, lubricating-oil additives; as anti-foam agents. Readily sulfated to form excellent detergents.

##### "Lorol" 5, 7, 9 and 11

Technical lauryl alcohols made up principally of lauryl and myristyl alcohols. Insoluble in water; completely miscible with methanol, 95% ethanol, ethyl ether and benzene. Viscous colorless liquids.

*Shipment:* tank cars and 55-gal. drums

##### "Lorol" 20



Essentially n-octyl alcohol. Slightly soluble in water; completely miscible with methanol, 95% ethanol, ethyl ether. Viscous colorless liquid.

*Shipment:* tank cars and 55-gal. drums.

##### "Lorol" 22



Essentially n-decyl alcohol. Insoluble in water; completely miscible with methanol, 95% ethanol, ethyl ether, benzene, cyclohexane, carbon tetrachloride, ethyl acetate, and acetone. Viscous colorless liquid.

*Shipment:* tank cars and 55-gal. drums.

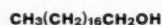
##### "Lorol" 24



Cetyl alcohol available in National Formulary grade. Insoluble in water; soluble in methanol, 95% ethanol, ethyl ether, benzene. White, waxy flakes.

*Shipment:* 125-lb. fiber drums.

##### "Lorol" 28



Stearyl alcohol available in technical and U.S.P. grades. Insoluble in water; slightly soluble in methanol, 95% ethanol, ethyl ether, benzene. White, waxy flakes.



# ARE PRODUCED WITH THESE DU PONT CHEMICALS

The Du Pont chemicals listed below are produced by advanced manufacturing techniques, subjected to rigid standards of quality control and backed by years of Du Pont chemical research and manufacturing experience. Du Pont Technical Representatives are also at your service to assist you in your specific applications.

Your processing and development work can benefit from these important time-proven Du Pont chemicals. For further information, write or call your nearest Du Pont Chemical Agent or Du Pont District Office.

Shipment: 50-lb. paper bags (industrial grade) and 50-lb. fiber drums (U.S.P. grade).

## SOLVENTS

### CYCLOHEXANOL—"Hexalin"\*



Excellent solvent for gums, waxes and resins. Clear, colorless liquid.

*Applications:* manufacture of ester plasticizers; non-corrosive degreasing agent for metals; diluent thinner of fuel-oil additives; stabilizer in textile soaps.

*Shipment:* tank trucks, tank cars and 55-gal. non-returnable steel drums. Available through your local Du Pont Chemical Distributor.

### CYCLOHEXANOL—"Hytrol"\* O



Outstanding solvent for nitrocellulose, polyvinyl chloride and its copolymers, resins and plastics. Clear, colorless liquid.

*Applications:* used in many types of finishes; active ingredient in vinyl dispersions; solvent for DDT and other insecticides.

*Shipment:* tank trucks, tank cars and 55-gal. steel drums. Available through your local Du Pont Chemical Distributor.

### FORMAMIDE



Exceptional solvent for inorganic salts, casein, gelatin, animal glue, starch, lignin, glucose and zein. Completely miscible with water, methanol, ethanol. Technical-clear, colorless liquid.

*Applications:* solvent; softener; intermediate in manufacture of pharmaceuticals and formic acid.

*Shipment:* tank cars and 55-gal. non-returnable steel drums.

### METHYL FORMATE



Solvent for cellulose ethers and esters, acrylic resins and polyvinyl acetate. Contains 97% of the ester by weight. Soluble in water; miscible with most organic solvents. Clear, colorless liquid.

*Applications:* solvent; in manufacture of formates and other organic chemicals including sulfa drugs; as an ingredient in production of fumigants.

*Shipment:* tank cars and 55-gal. drums.

## OTHER CHEMICALS

### DIMETHYL SULFATE



Highly reactive, economical to use. Boiling point of 188.8°C. permits use at atmospheric pressure. Soluble in alcohol, ether and benzene. Clear, colorless liquid.

*Applications:* important methylating agent in organic synthesis; used in manufacture of many synthetic drugs and in certain dye intermediates.

*Shipment:* tank cars and special 55-gal. returnable steel drums.

### UREA—Crystal and Shotted



Most versatile of all basic chemicals. Du Pont Urea is a time-tested product of highest quality and uniformity. Supplied in two forms . . . white crystals or pellets (Shotted).

*Applications:* include manufacture of urea-formaldehyde thermosetting resins; as a solubilizer; softening agent by paper industry; in the synthesis of dyes and pharmaceuticals.

*Shipment:* both forms supplied in 100-lb. multi-ply paper bags. Available through your local Du Pont Chemical Distributor.

\*REG. U. S. PAT. OFF.

## POLYCHEMICALS DEPARTMENT



BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

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YOUR LOCAL AGENT OF DU PONT METHANOL, UREA,  
"HEXALIN" CYCLOHEXANOL & "HYTROL" O CYCLOHEXANONE**

### FOR METHANOL

<b>ARIZONA</b> Phoenix	Braun Chemical Co.
<b>CALIFORNIA</b> Los Angeles San Francisco	Braun Chemical Co. Braun-Knecht-Heimann Co.
<b>COLORADO</b> Denver	The Chemical Sales Co.
<b>FLORIDA</b> Jacksonville Miami Orlando Tampa	Apperson Chemical, Inc. Bicayne Chemical Labs, Inc. Lentley Supply Company Lentley Supply Company
<b>GEORGIA</b> Atlanta	Chemical Services, Inc.
<b>ILLINOIS</b> Chicago Chicago	Central Solvents & Chemicals Co. Phillips & Martin Co.
<b>INDIANA</b> El Wayne	Hoosier Solvents & Chemicals Corp. Hoosier Solvents & Chemicals Corp.
<b>IOWA</b> Des Moines	Miller Chemical Company
<b>KANSAS</b> Wichita	Barada & Page, Inc.
<b>KENTUCKY</b> Louisville	Dixie Solvents & Chemicals Co.
<b>LOUISIANA</b> New Orleans	Southern Solvents & Chemicals Corp.
<b>MARYLAND</b> Baltimore	Leidy Chemicals Corp.
<b>MASSACHUSETTS</b> Boston Holyoke	Howe & French, Inc. Eastern Chemicals, Inc.
<b>MICHIGAN</b> Detroit Grand Rapids	Western Solvents & Chemicals Co. Wolverine Solvents & Chemicals Co.
<b>MINNESOTA</b> St. Paul	Lyon Chemicals, Inc.
<b>MISSOURI</b> Kansas City Kansas City St. Louis	Barada & Page, Inc. Missouri Solvents & Chemicals Co. Missouri Solvents & Chemicals Co.
<b>METROPOLITAN NEW YORK</b> Lyndhurst, N. J.	Stoney-Mueller, Inc.
<b>NEBRASKA</b> Omaha	Miller Chemical Co.
<b>NEW JERSEY</b> Lyndhurst	Stoney-Mueller, Inc.
<b>NEW MEXICO</b> Albuquerque	Braun Chemical Co.
<b>NEW YORK</b> Albany Binghamton Buffalo Johnstown New York Rensselaer Rochester Syracuse	Eastern Chemicals, Inc. Collier Chemicals, Inc. Chemical Sales Corp. S. H. Ireland Chemical Company Stoney-Mueller, Inc. Eastern Chemicals, Inc. Chemical Sales Corp. Eastern Chemicals, Inc.
<b>NORTH CAROLINA</b> Durham	Cardinal Products, Inc.
<b>OHIO</b> Cincinnati Cleveland Toledo	Amsco Solvents & Chemicals Co. Ohio Solvents & Chemicals Co. Toledo Solvents & Chemicals Co.
<b>OKLAHOMA</b> Tulsa Oklahoma City	Ward Chemical & Supply Co. Ward Chemical & Supply Co.
<b>OREGON</b> Portland	Van Waters & Rogers, Inc.
<b>PENNSYLVANIA</b> Pittsburgh	Vitro Manufacturing Co.

<b>TENNESSEE</b> Memphis Nashville	Chapman Chemical Co. Chapman Chemical Co.
<b>TEXAS</b> Dallas Dallas Houston Houston El Paso	Texas Solvents & Chemicals Co. Van Waters & Rogers, Inc. Texas Solvents & Chemicals Co. Van Waters & Rogers, Inc. Braun Chemical Co.
<b>UTAH</b> Salt Lake City Salt Lake City	Braun-Knecht-Heimann Co. Wasatch Chemical Co.
<b>WASHINGTON</b> Seattle Spokane	Van Waters & Rogers, Inc. Van Waters & Rogers, Inc.
<b>WISCONSIN</b> Milwaukee	Wisconsin Solvents & Chemicals Corp.

### FOR UREA

<b>ARIZONA</b> Phoenix	Braun Chemical Co.
<b>ALABAMA</b> Birmingham Mobile	F. H. Ross & Co. F. H. Ross & Co.
<b>CALIFORNIA</b> Los Angeles San Francisco	Braun Chemical Co. Braun-Knecht-Heimann Co.
<b>CONNECTICUT</b> South Norwalk	Merchants Chemical Co., Inc.
<b>FLORIDA</b> Jacksonville	F. H. Ross & Co.
<b>GEORGIA</b> Atlanta Columbus Savannah	F. H. Ross & Co. F. H. Ross & Co. F. H. Ross & Co.
<b>ILLINOIS</b> Chicago	Central Solvents & Chemicals Co.
<b>INDIANA</b> El Wayne Indianapolis	Hoosier Solvents & Chemicals Corp. Hoosier Solvents & Chemicals Corp.
<b>KENTUCKY</b> Louisville	Merchants Chemical Co., Inc.
<b>LOUISIANA</b> New Orleans	Barada & Page, Inc.
<b>MARYLAND</b> Baltimore	Leidy Chemicals Corp.
<b>MASSACHUSETTS</b> Fall River Stoneham Worcester	Borden & Remington Co. George Mann & Co., Inc. Chemical Sales & Service Co., Inc.
<b>MICHIGAN</b> Detroit	Eaton Chemical & Dyestuff Co.
<b>MINNESOTA</b> Minneapolis	Merchants Chemical Co., Inc.
<b>MISSISSIPPI</b> Jackson	F. H. Ross & Co.
<b>MISSOURI</b> Kansas City St. Louis St. Louis	Barada & Page, Inc. Barada & Page, Inc. Missouri Solvents & Chemicals Co.
<b>NEW JERSEY</b> Newark Paterson	National Oil & Supply Co. Brown Chemical Co., Inc.
<b>NEW YORK</b> Buffalo Hicksville, Long Island New York	Chemical Sales Corp. National Oil & Supply Co. Merchants Chemical Co., Inc.
<b>NORTH CAROLINA</b> Charlotte Greensboro Raleigh	F. H. Ross & Co. F. H. Ross & Co. F. H. Ross & Co.

<b>OHIO</b> Cincinnati Cleveland Columbus	Merchants Chemical Co., Inc. Ohio Solvents & Chemicals Co. Merchants Chemical Co., Inc.
<b>OREGON</b> Portland	Van Waters & Rogers, Inc.
<b>PENNSYLVANIA</b> Allentown Erie Middletown (Harrisburg) Philadelphia Pittsburgh	Western Penna. Chemical Co., Inc. Western Penna. Chemical Co., Inc. Western Penna. Chemical Co., Inc. Pioneer Salt Co. Western Penna. Chemical Co., Inc.
<b>RHODE ISLAND</b> Providence Providence	Borden & Remington Co. George Mann & Co., Inc.
<b>SOUTH CAROLINA</b> Columbia Greenville	F. H. Ross & Co. F. H. Ross & Co.
<b>TENNESSEE</b> Chattanooga Knoxville Knoxville Nashville	Burkart-Schier Chemical Co. Burkart-Schier Chemical Co. F. H. Ross & Co. Burkart-Schier Chemical Co.
<b>TEXAS</b> Dallas Houston	Van Waters & Rogers, Inc. Van Waters & Rogers, Inc.
<b>UTAH</b> Salt Lake City	Braun-Knecht-Heimann Co.
<b>WASHINGTON</b> Seattle	Van Waters & Rogers, Inc.
<b>WISCONSIN</b> Milwaukee	Merchants Chemical Co., Inc.

### FOR "HEXALIN" & "HYTROL" O

<b>CALIFORNIA</b> Los Angeles Los Angeles San Francisco	Braun Chemical Co. Melford Chemical Company Braun-Knecht-Heimann Co.
<b>ILLINOIS</b> Chicago	Central Solvents & Chemicals Co.
<b>INDIANA</b> Fort Wayne Indianapolis	Hoosier Solvents & Chemicals Corp. Hoosier Solvents & Chemicals Corp.
<b>KENTUCKY</b> Louisville	Dixie Solvents & Chemicals Co.
<b>LOUISIANA</b> New Orleans	Southern Solvents & Chemical Corp.
<b>MASSACHUSETTS</b> Boston Worcester	Howe & French, Inc. Chemical Sales & Service Co., Inc.
<b>MICHIGAN</b> Detroit	Western Solvents & Chemicals Co.
<b>MINNESOTA</b> Minneapolis	Merchants Chemical Co., Inc.
<b>MISSOURI</b> Kansas City St. Louis	Missouri Solvents & Chemicals Co. Missouri Solvents & Chemicals Co.
<b>NEW JERSEY</b> Newark	C. P. Chemical Solvents, Inc.
<b>OHIO</b> Cincinnati Cleveland Toledo	Amsco Solvents & Chemicals Co. Ohio Solvents & Chemicals Co. Toledo Solvents & Chemicals Co.
<b>TEXAS</b> Dallas Houston	Texas Solvents & Chemicals Co. Texas Solvents & Chemicals Co.
<b>WISCONSIN</b> Milwaukee	Wisconsin Solvents & Chemicals Corp.

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Other high-quality products of the Du Pont Polychemicals Department are available from strategically located stock points throughout the country. For more information, contact your nearest Du Pont district office.

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**POLYCHEMICALS DEPARTMENT**



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BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

**Casebook: Data from Dozen Problems-continued**

## 5. Casebook: Data from Dozen Problems

At San Francisco, Stauffer receives bulk sulfuric and muriatic acid from Richmond, transfers them to carboys for delivery to local customers. It formerly handled carboys as they arrived on the warehouse floor. Six months ago, the firm modernized the whole procedure. Now, returned carboys are stored until a sufficient number have accumulated. Then the boxes are repaired, carboys washed and placed on a conveyor. Boxes are painted, bottles dried in infrared ovens, boxes are stenciled and placed (empty) on pallets. A fork truck takes them to a filling station. Savings: cut in labor by at least two men; reduction in warehouse space by half. Max Spealman, Western production manager, estimates that return on investment for the system has been raised by 12% after taxes.

At its Salt Lake City mill, Vitro Uranium Co. replaced a phosphate precipitation unit with a new solvent extraction process. It also put in a new ore-assaying plant that "paid for itself." It eliminated use of a high-cost solvent, put in an improved solvent recovery system, built a high degree of automation into processing units. (This later cut labor costs but also increased costs for maintaining instruments.) Net result was increased from 550 tons/day to 660 tons/day; operating costs were slashed by 23%.

Allied Chemical had a major manufacturing facility that utilized 48 continuous reactors with semimanual handling of solid materials to and from the units. Operator control was maintained from many points. Detailed job and method analysis, work simplification studies, together with simultaneous engineering design studies, led to development and installation of two fully mechanized automatic reactors. Savings in labor, raw materials, repairs and energy have been running \$1 million or more per year for several years.

At Midland, Mich., several years ago, Dow installed a central Teletype station connecting with its sales offices (CW, March 10, '51). When an order reached the plant, it was sent by messenger to one of 86 shipping points. Recently, the company extended the Teletype system to 26 strategically located spots inside the plant. Associated simplification of order-handling procedures was inaugurated, too. Installing the Teletype cost about \$2,000. It saved some labor through the elimination of the messenger service. This is just about balanced out by the rental cost for the extra Teletype facilities. Big saving is time: Dow has speeded up its delivery services to customers by 24 hours.

**Casebook: Data from Dozen Problems-continued**

At Belle, W. Va., Du Pont is putting the finishing touches on one of the biggest modernization programs ever undertaken in the process industries. Engineering is just about finished on the conversion to natural gas (from coke ovens) for making synthesis gas. The switch from coke ovens to natural gas for ammonia has, of course, been a significant postwar trend. Allied started to change over its big Hopewell and South Point plants back in 1951, completed the task in '53. However, Allied has close ties with the steel industry, could find a ready use for its coke ovens. Du Pont has no such ties. What's more, it was loath to give up coal as a raw material. Located deep in

West Virginia's coal country, the Belle plant used 1 million tons annually. Switching to natural gas would reduce coal demand in the area by half this amount. (Du Pont will continue to use some 500,000 tons as fuel there.) Also, the coal industry is a good customer for Du Pont's explosives. For those reasons, it put in a partial combustion process to make synthesis gas from coal

(CW, June 6, '53, p. 36). But the coal-based process just couldn't compete economically with those based on natural gas.

"Coke ovens have to be rebuilt periodically," says Ernst Habicht, director of manufacturing for Du Pont's Polychemicals Dept. "And we had to face the decision of whether to rebuild or convert. Fortunately, at the same time, gas became available in a quantity that would justify the switch. We had to have the right timing. Gas had to be available when the coke ovens started to run down."

At Hopewell, Hercules had a narrow-gauge railroad system for moving material from the warehouse to processing area. The system was adequate and there were strong doubts as to whether the firm could ever justify abandoning the narrow-gauge system. When it expanded warehouse facilities, however, it found that it would have to add extra fork trucks to carry the material into the warehouse. A study proved that it would be more economical to scrap the railroad and install a gasoline-propelled "mule train." The mule train travels on pavements, is capable of going right into the buildings. It gives the plant a more flexible system and will make expansion simpler.



# Wonder Drug? No...

**he's analyzing soil at the site of your new plant**

*Finding the right location* for a new plant is not a problem of land availabilities alone. It is complicated by many other factors—natural resources, labor, power, taxes, zoning laws, community facilities—a thousand and one details.

*That's where we can help you.*

To secure accurate advice in these fields North Western taps the resources of its *entire organization*. That's why we can supply information on any subject from sewer lines to school facilities and *guarantee* the accuracy of the details.

North Western offers a complete and comprehensive Industrial Site Service. Here are some of the things we do (there are many more):

- Analyze topography, soil and water conditions
- Report in detail on labor, power and all other utilities
- Investigate all tax and zoning laws
- Check proximity of raw materials required
- Report on market accessibility and complete marketing area
- Factual report on all community facilities
- Condition the community for industry acceptance
- Furnish complete information on rail, air, truck and water transportation

Call us in when plant expansion is being discussed in your company. No obligation for this service, and all inquiries are confidential. Address:

**GENE F. CERMAK**

Director of Industrial Development, C. & N. W. Ry., 400 W. Madison St., Chicago 6, Illinois

**CHICAGO AND  
NORTH WESTERN  
RAILWAY**



## Casebook: Data from Dozen Problems-continued

At a calcium chloride production unit, Dow moved the chemical in 100-lb. bags to a warehouse two miles away. Each bag was handled five times. When the warehouse was installed, labor costs were cheap and the area near the production unit was occupied by other facilities.

Labor costs rose so that handling costs amounted to \$7-7.50/ton. Concomitant obsolescence of processes adjoining the calcium chloride production unit enabled the firm to raze buildings, install a new warehouse. A pole-type building with corrugated aluminum siding was put up for \$2.91/sq. ft. Bags move from packaging station on conveyor to warehouse, are palletized and stored. Conveyor and palletizing equipment cost approximately \$30,000. Bags are handled only once. Handling costs are down to \$2-2.50/ton.

At Bay City, Mich., Dow converted an idle coal-handling facility into a marine terminal. This reduced the need for hauling packaged export orders to Detroit. Using pole-type construction, the firm was able to build a minimum facility costing about \$2.50/sq. ft.

Freight costs from Bay City are the same as from Detroit. By the conversion, Dow was able to reduce the overland haul from 120 miles (to Detroit) to 20 miles (to Bay City). Cost of conversion was small. Savings reportedly amount to "several dollars per ton." In addition, says Gordon Anderson, traffic manager for the Midland Division, "It puts us in a position to take advantage of the savings afforded by the opening of the St. Lawrence Seaway."

At an Allied Chemical plant, a two-shift, seven-day grinding, sizing, packaging and shipping operation required a total of 35-45 men. Detailed task and method studies led to changes in bulk storage, bulk handling, grinding and sizing control, packaging and packaging handling. Manual labor is now reduced to pushing but-tons, handling empty containers and the physical stacking of filled packages in truck or railroad car. The whole job is now carried out by five men working one shift five days a week.

At a caustic-chlorine installation, Hercules was employing 80 Hooker S cells. They had been operating since 1939. It decided to modernize, put in Hooker S-3 cells. The modernization cost three times as much as the original plant. But the 72 new cells installed had 85% more capacity than the original 80 cells.



## THIS COUNTRY HAS A GOOD 5¢ RESIN\*

### VINSOL:

- Is a high-melting, dark-colored thermoplastic.
- Is saponifiable by alkali to form soaps.
- Is reactive with aldehydes to form resins.
- Is substantially insoluble in aliphatic hydrocarbons.
- Is compatible with a wide range of resins and plasticizers.

#### Typical Properties

Melting Point (ring and ball).....	112°C.
Acid Number .....	94
Saponification Number .....	165
Gasoline Insoluble .....	83%
Oxygen Absorption .....	0.25%

Available in lump, flake, pulverized, and emulsion forms. Also as a powdered sodium soap.

\*In Carloads, f.o.b. Plant

# VINSOL®

Pine Chemicals Division, Naval Stores Department  
**HERCULES POWDER COMPANY**  
INCORPORATED  
 900 Market Street, Wilmington 99, Delaware



NV5B-1

## 6. Organize to Modernize. A Best Way?

There are no pat solutions of the problem of setting up an organization to cope with the modernization problem. But most chemical companies agree that a sound organization has the following characteristics:

- It should be set up to constantly review plants and processes to make sure they are kept up to date. A sporadic effort just won't do in the chemical industry.

- The prime responsibility for keeping the plant modern should rest with the plant operating personnel. This follows logically from this group's responsibility for controlling production costs. A common procedure is to have a technical group in the plant keep constant check on operations, watching costs, return on investment, safety and product quality. When something goes awry, the group hoists a warning flag.

- Communications between the plant and staff functions, such as central engineering or research, should be so set up that the plant's technical group can get support when needed.

**Down the Line:** Typical of a chemical process company's approach is that taken by Wyandotte. Within the Michigan Alkali Division—which makes and sells the company's products—improvement in everyday plant operations is the continuing responsibility of first-line supervisors. The quality-control department has process chemical engineers, who are trouble shooters and who may suggest improvements or changes in the operation. In Wyandotte's research and engineering division, the process research department has the responsibility for developing long-range and basic changes in the processes. In addition, in the course of their work, engineering design personnel develop equipment improvements for going processes.

Among different companies there will, of course, be differences in the organizational approach. For instance, Du Pont's huge engineering department is staffed with specialists, who are available for consultation with the operating departments. In addition, they initiate ideas, which they try to sell to the operating departments. Allied is doing substantially the same thing on a more modest scale—thus

far, at least. Last fall, it appointed Jim Armstrong director of management engineering, provided him with a staff of a half-dozen engineers, all specialists. Hercules, on the other hand, doesn't believe it is big enough to support a large stable of specialists. It prefers to staff its engineering department with men capable of working in any phase of engineering.

Du Pont, which organizes for modernization in the same way as do many other chemical companies, has a special approach for the biggest problems: it sets up a task force. This is how the method works:

The general manager of an operating department and Chief Engineer Read decide whether the problem warrants setting up a task force, which usually consists of 5 to 15 top men. These staffers are relieved of all other duties to work full-time on the problem. Heading the task force is a man from the industrial department; members may be from sales, production and research, along with top con-

sultants (from engineering) on estimating, design and construction. The important thing, says Gilbert Church, staff assistant in the Engineering Dept., "is that they are all top men—people who will be seriously missed from their regular jobs."

A typical problem for a new-plant task force might be to reduce capital investment 20%; operating personnel, 50%; power costs, 40%. The task force sets a budget and timetable. These preliminaries might take a month. Then it drives for the goals.

Du Pont doesn't believe in setting up a task force for less than a very weighty problem. In the past couple of years, it has used task forces on about 10 occasions.

This kind of reasoning is in line with that of other chemical companies, which agree that the biggest problem should get the most attention. Most important of all, they feel, an organization should be kept flexible enough to examine, and cope with, each problem individually as it arises.



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## **WORLD'S FIRST COMMERCIAL SCALE SHELL PROCESS ETHYLENE OXIDE PLANT ON STREAM**

### **Plant for Wyandotte Chemicals Corporation Reaches Capacity Within 2 Weeks of Start-up**

The first commercial scale plant to use the Shell Development Company's direct oxidation process for making ethylene oxide is on stream for Wyandotte Chemicals Corporation at Geismar, La.

This is the first of three ethylene oxide plants being designed, engineered and constructed by The Lummus Company, each with an annual capacity equivalent to 60,000,000 lbs. of ethylene oxide.

Most of Wyandotte's oxide will be converted by thermal hydration to ethylene glycol for industrial and antifreeze uses.

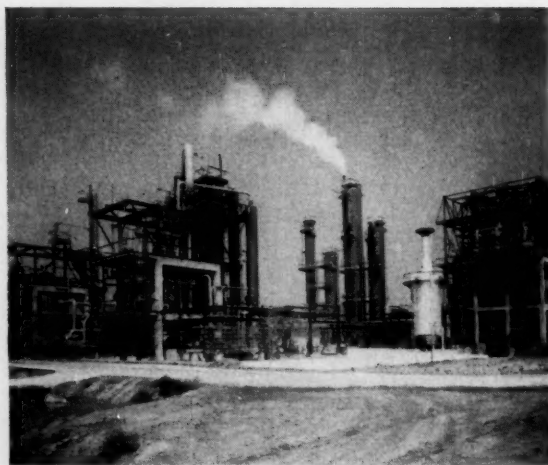
The process units at Wyandotte consist of an ethylene oxide reaction section, an ethylene oxide purification section, an ethylene glycol section and an oxygen generation section.

Non-process units provided by Lummus include: tankage and yard transfer facilities, cooling and fire-water system, an administration building, change and gate house, warehouse and shop building, and a garage and firehouse.

In the Shell Process for making ethylene oxide, ethylene is reacted with oxygen over a silver catalyst in a fixed bed reactor.

The Shell innovations which have been thoroughly tested in pilot plants offer several noteworthy advantages. Among these are high yields and virtual elimination of the waste disposal problems encountered in the chlorohydrin process. The plant uses oxygen, which requires less capital investment than the use of air.

The other two plants currently under construction by Lummus are for Calcasieu Chemical Corpora-



tion, at Lake Charles, La. and for Petrochemicals Ltd., one of the Royal Dutch Shell group of companies, at Partington, England. Both are scheduled to go on stream later this year.

Lummus is proud of the initial performance at Wyandotte in placing the Shell Process into full scale application. These ethylene oxide plants are 3 more of the over 800 plants designed, engineered and constructed by The Lummus Company throughout the world, in the last 50 years, for the process industries. Lummus is ready to place this experience at your disposal.

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# ENGINEERING

## THREE SULFITE PULPING PROCESSES

### LIQUOR MAKEUP

#### Calcium Acid Sulfite

Requires large excess of sulfur dioxide to hold calcium in solution; cooling needed to reduce pressures contributes to high heat losses.

### COOKING

Requires eight-hour cooking step; heating rate is critical to prevent chip burning; excess phenols in wood cause unfavorable reactions.

### RECOVERY

None

#### Magnesium Acid Sulfite

Requirements are similar to those of calcium acid sulfite; but higher solubility of magnesium sulfite permits use of simpler equipment.

Cooking requirements are about the same — eight-hour cook, critical heating rate — as those of calcium acid sulfite liquor.

85-90% of magnesium hydroxide and sulfur dioxide can be returned to makeup by relatively simple process; heat recovery is excellent.

#### Magnefite

Requires no excess sulfur dioxide, thereby eliminating pressure problems; liquor can be made, stored at high temperature to conserve heat.

Shortens cooking time to about five hours; increases yield by 5%; reduces heat requirements; can handle mixed wood species; phenol is no problem.

Chemical and heat recovery are about the same as with magnesium acid sulfite; direct use of heat to raise acid temperature simplifies heat recovery.

## New Incentive for Pulping Switch?

Papermakers this week are eager to get the first full evaluation of a new way to reduce pollution problems and to improve recovery of heat and chemicals from spent sulfite cooking liquors. The improvements are claimed for the novel Magnefite process—a new magnesium-base sulfite pulping technique developed by Howard Smith Paper Mills (Cornwall, Ont.).

The new process is an outgrowth of one of the company's older magnesium-base pulping techniques—a simple, efficient recovery process developed by the company's George Tomlinson, Sr., based on the use of magnesium in place of the calcium usually used in acid sulfite liquors.

Though the older magnesium pulping process solves most of the sulfite pulpers' recovery and pollution problems, and has been chosen for mills with 500,000-tons/year pulp capacity, it's still subject to several of the op-

erating limitations of calcium sulfite. In Howard Smith's case, the scarcity of the spruce and balsam best suited to sulfite pulping provided the greatest incentive to develop for its new Magnefite process.

**No Free Acid:** The distinguishing feature of its development is the absence of free sulfurous acid in the liquor. In plant-scale tests recently completed and now being evaluated, these processing advantages—made possible by the elimination of excess sulfur dioxide—have shown up:

- Greater heat economy—Magnefite cooking liquor can be made at elevated temperatures (60-70 C), using heat in the combustion gas; conventional sulfite liquor must be cooled to keep sulfur dioxide from "boiling" off.

- Simpler equipment—Magnefite liquor can be heated with relief gas and can be stored under atmospheric pressure at temperatures close to the

boiling point, without the complex equipment needed in other systems for recycle of excess sulfur dioxide.

- Faster, less critical cooking—without excess sulfur dioxide to cause chip "burning", Magnefite digesters can be brought up to full operating temperature faster; shorter cooking time (about five hours with Magnefite vs. about eight hours with other sulfite liquors) increases digester throughput. Since preheated liquor can be used, Magnefite system is adaptable to continuous pulping cycle in which the liquor must be maintained at constant cooking temperature.

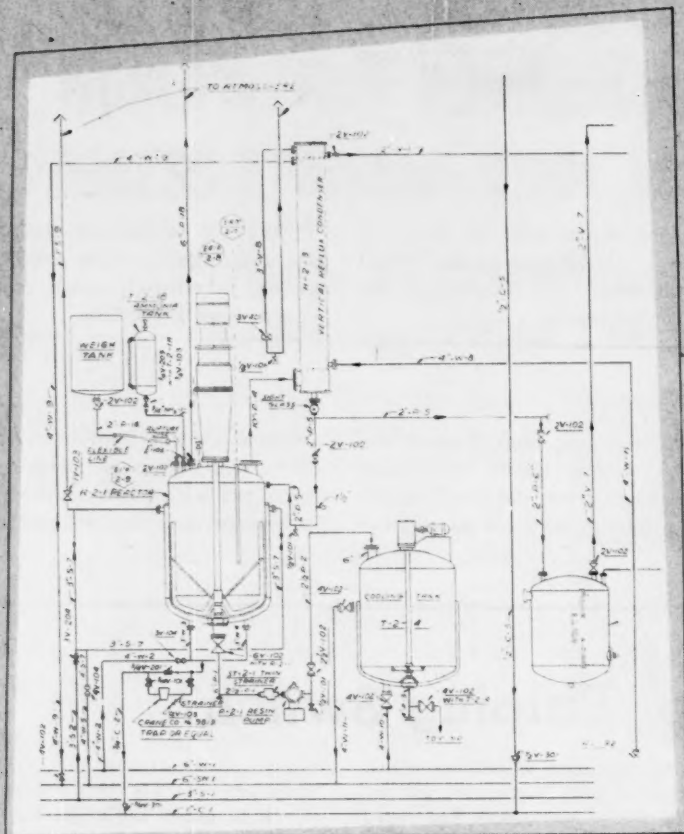
- Fewer undesirable reactions—Magnefite process operates at a pH of 3.5-4.5, therefore reacts more slowly than acid sulfite (pH of about 1.5) with phenols present in the wood.

- Higher yields, better quality of pulp—Magnefite gives 5% increase in yield, with less cellulose degradation; pulps are as easily bleached as conven-



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For further details on this process, or on any resin plant, contact I\*P\*E's Process Plants Division, Dept. 1.



## INDUSTRIAL PROCESS ENGINEERS

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## ENGINEERING

tional sulfite pulps, but exhibit greater strength—approaching that of sulfate pulps.

**Chemical Recovery:** Like the older magnesium-base sulfite process, the Magnefite system permits complete recovery of pulping chemicals. Spent liquor from the digesters is first concentrated to about 55% solids by evaporation, then burned to provide process heat. Sulfur, as the dioxide, and magnesium, in the form of an easily separable magnesia fly ash, are recovered and recombined into cooking liquor in relatively simple absorption equipment.

In many respects, says Smith, the new Magnefite recovery system is even simpler than its older magnesium system, initially installed by Smith, Babcock & Wilcox and Weyerhaeuser Timber Co. at the latter's Longview Wash., mill, and just put into Brown Co.'s Berlin, N.H. unit.

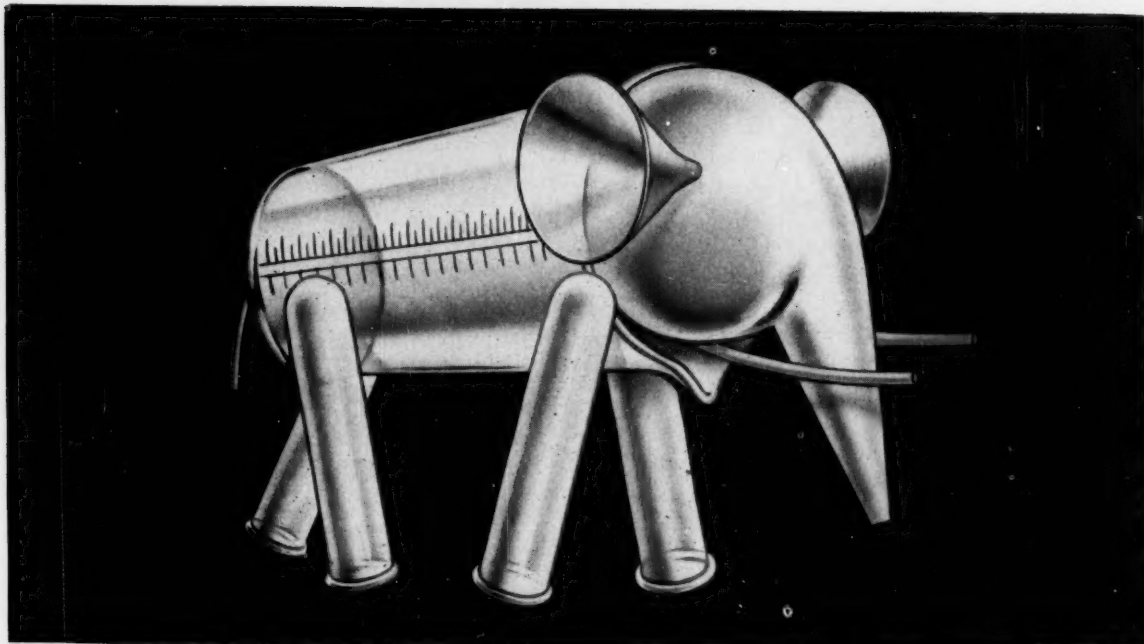
For one thing, heat recovery equipment is less complicated because in the new process, the heat can raise the liquor temperature directly. And absence of foul-smelling compounds, such as hydrogen sulfide and mercaptans, in the recovery system not only prevent air pollution headaches, but also contribute to major economies of operation. Reason: odor-free water recovered from the evaporators and furnace can be used directly for pulp washing and bleaching, thereby saving steam.

**Long-Range Prospect:** Because the Cornwall mill has no recovery facilities, the recently completed tests were aimed primarily at determining the Magnefite process's ability to handle a variety of mixed woods. And despite the high cost of operating the hole mill (150-175 tons/day) without chemical recovery, the results, says the company's research director George Tomlinson II, have been "quite encouraging."

Originally, the increasing cost of sulfite-pulping woods in the Cornwall area forced the company to consider the possibility of switching to the kraft process.

And though Smith's present supply situation (the company already has a two-year supply of wood) will likely preclude an early switch to another pulping system, says Tomlinson, the Magnefite process is definitely an important factor in the company's long-range planning.





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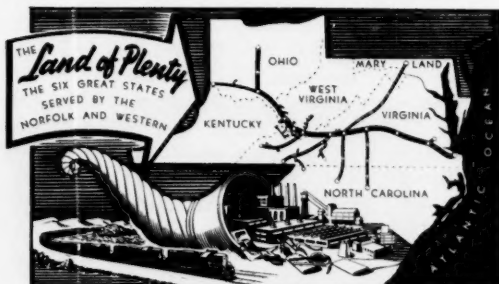
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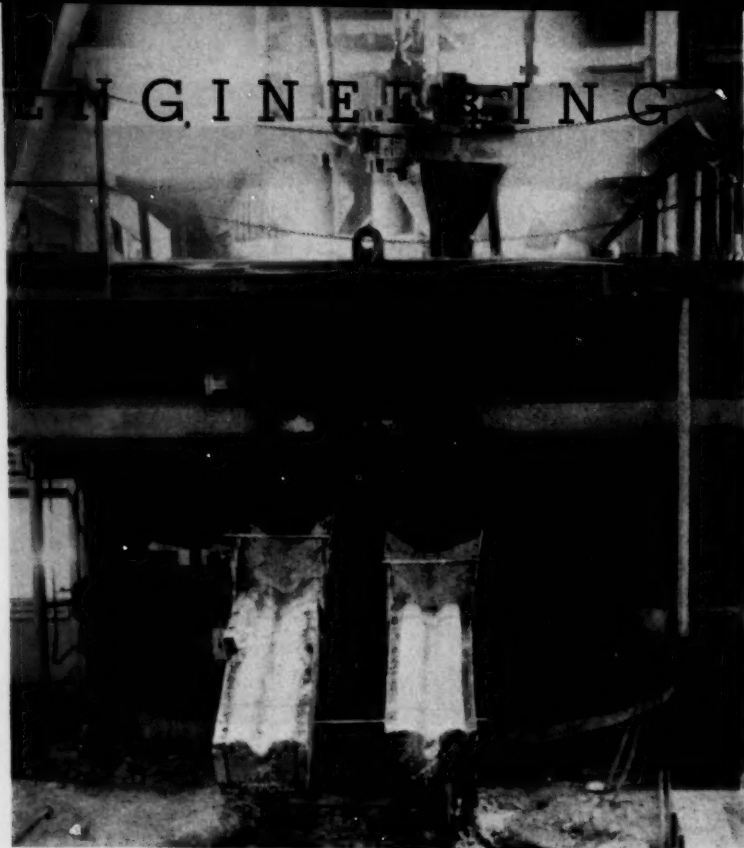
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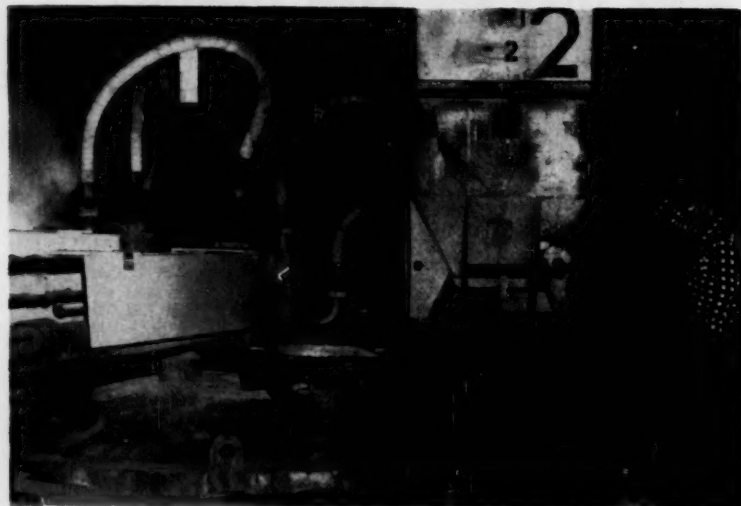


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Charging hot, prereduced ore to furnace . . .



cuts power needs of new electric-smelting process.

## Blast-Furnace Bypass

"Guaranteed economic performance in integrated steel plants" was claimed last week for latest wrinkle in steelmaking, the Strategic-Udy direct iron reduction process that utilizes a rotary kiln and an electric arc furnace to bypass the conventional blast furnace-coke oven operation.

Strategic Materials Corp. and Koppers Co. are currently winding up a series of processing studies at Strategic's semiworks plant in Niagara Falls, Can., have already seen enough merit in the technique to make the performance guarantee (*CW Technology Newsletter*, Oct. 4).

**Limiting Economics:** Electric-furnace smelting isn't new to the industry, but its use in this country has been generally limited to the production of relatively valuable materials. For the production of iron, it's competitive with the blast furnace only where raw material costs are high, and power costs and capacity requirements are relatively low. In the past, say Strategic and Koppers, the electric-furnace technique required one or more of the following conditions: power cost of less than 6 mils/kwh., coking coal costs above \$15/ton, plant capacity of less than 1,000 tons/day of iron, iron scrap cost above \$50/-ton, necessity of minimum capital cost, high-quality iron ore. Today, however, improved techniques of electric-furnace smelting have altered these economic limitations considerably and units operating at a cost of \$44/-ton are definitely possible. And it's quite likely, the companies add, that several iron-smelting electric furnaces will be installed in North America in the next few years.

**Two-Stage Reduction:** The direct iron reduction process employed in the prototype plant at Niagara Falls starts with the preheating and prereduction of iron ore with flux and a carbonaceous reducing agent in an 80-ft.-long rotary kiln. The kiln is heated by the combustion of carbon monoxide produced by reduction reactions in the electric-arc furnace, is kept between 1800-2300 F. During this operation, about 37% of the iron in the ore is reduced to metal, the rest to ferrous oxide. This hot, prereduced ore from the kiln (with metal unseparated) is charged directly to the electric-arc furnace through insulated feed control bins and controlled feeders. Preheating is an aid in reducing electrical power requirements to about one-half of that needed by conventional electric-furnace smelters.

Key to the actual arc-smelting step is the furnace design, which simplifies charging of the prereduced ore directly into the reaction zone and facilitates removal of the carbon monoxide formed by the reduction. This "floating charge" method of furnace operation was invented by Marvin Udy and originally developed by Strategic-Udy Metallurgical and Chemical Processes, Ltd., for the production of manganese from low-grade ore (*CW* Feb. 9, '57, p. 40).

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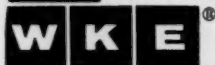
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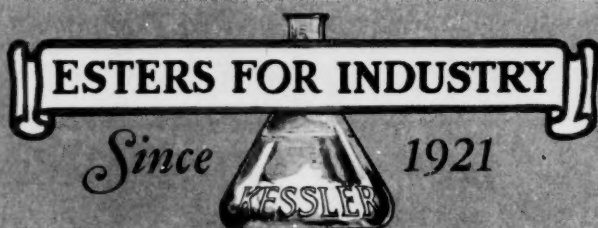


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## ENGINEERING

Reaction between the coal and the iron oxides in the molten bath is extremely rapid; accurate control of slag composition permits selective removal of contaminants such as titanium, phosphorus, manganese, chromium and nickel. Exact carbon control of the iron can be adjusted by finishing additions of reducing agent or ore during the final smelting step, making it possible to vary the carbon content from 3.5% in pig iron to 0.2% in semisteel.

**Cost Yardstick:** Typical costs for manufacturing iron by the Strategic-Udy process, utilizing purchased ore at a Great Lakes port, purchased coal, purchased oil and power, are estimated at \$31.57/ton for materials, \$6.21/ton for power requirements, 43¢/ton for utilities and \$5.50/ton for labor—a total manufacturing cost of \$43.71/ton (based on a 300-ton/-day unit).

Direct comparison of capital costs of a Strategic-Udy installation with those of a conventional blast furnace plant is difficult, Strategic and Koppers point out, because of the wide variation in economic factors and the large difference in the minimum economic size of each type of plant. For rough comparison, the capital cost of a minimum-size blast furnace installation (1,500 tons/day) is estimated at about \$50/annual ton of pig iron, plus \$30/annual ton for the required by-product coke plant. Capital cost of a minimum-size Strategic-Udy plant (600 tons/day) is placed at about \$50/annual ton of pig iron.

Blast furnaces considerably larger than the 1,500-ton/day minimum size are becoming more common, have a much lower capital cost. But, a 600-ton/day Strategic-Udy plant represents a maximum unit size, based on maximum electric furnace size (20,000 kva.) for optimum efficiency.

Two other features that Strategic and Koppers feel may enhance electric-arc smelting's chances for commercial success are (1) its ability to use in whole or in part iron ores that are not suitable for blast furnace feed and (2) its ability to use a wide variety of relatively inexpensive carbonaceous materials as the reducing agent. All the companies require for their economic performance guarantee is "availability of reasonably priced electric power and the advantageous location of raw materials."





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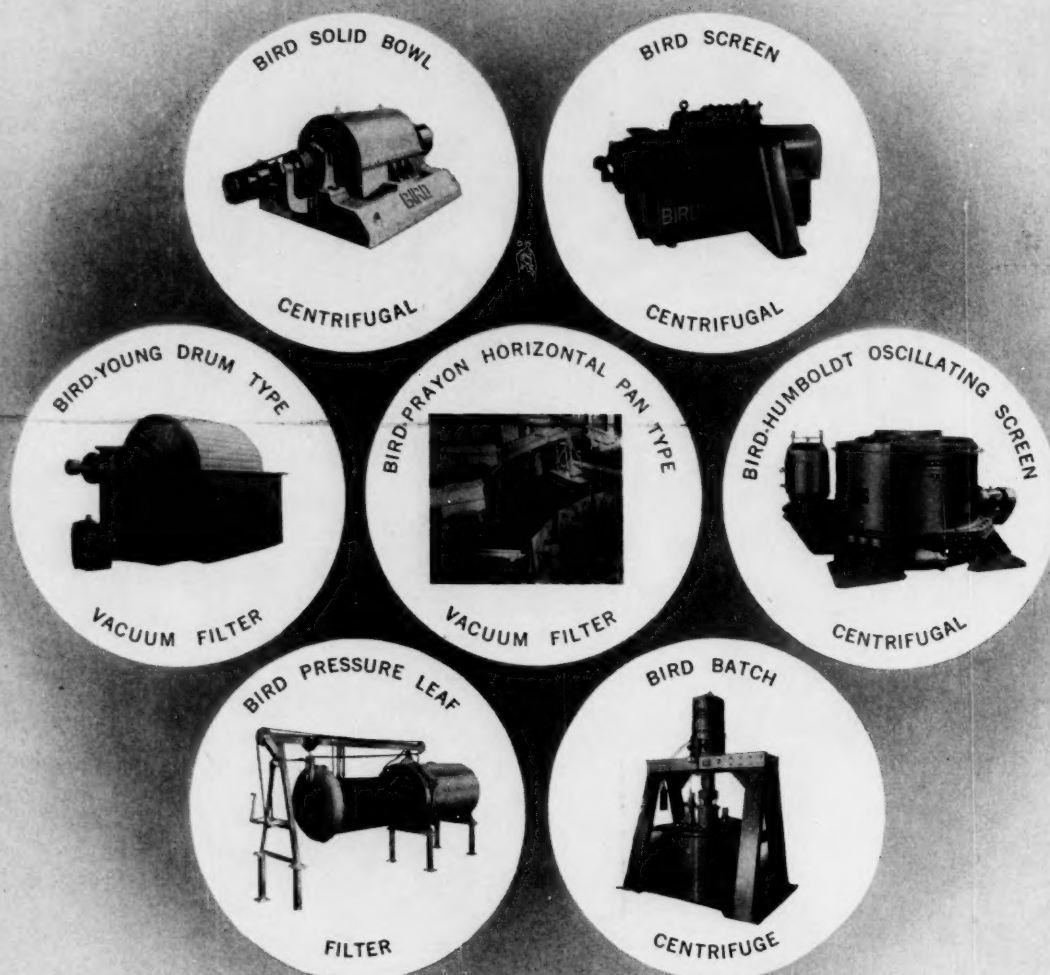
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## Building Science into Centrifuge Rating

The array of formulas being developed by Sharples' Charley Ambler (right) are part of a major sales simplification step, the Sigma concept, and Sharples' salesmen are this week telling their process industry customers how Sigma can simplify their job of rating competitive makes of centrifuges.

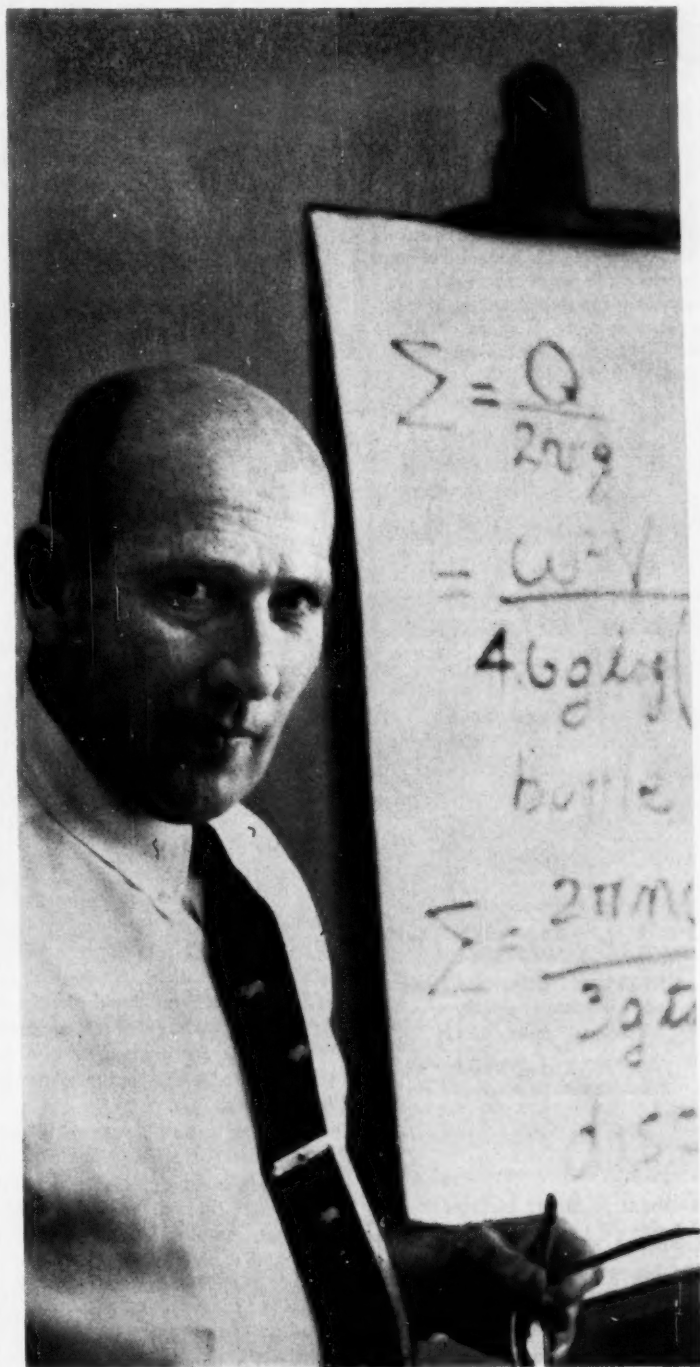
There's nothing new about Sigma. Ambler, director of chemical engineering for Sharples and creator of the concept, published a paper on it over six years ago. Other centrifuge makers have their own versions—or variations—of it. But Sigma was developed as a design tool: after data for a certain application has been gathered on a small centrifuge, Sigma guides the design of the right size of machine to handle a larger throughput. As a scale-up tool, it has proved highly useful—but it has also proved highly esoteric.

Then Sharples reasoned: If it can be used to predict the size needed for a bigger operation, why can't it be used to rate centrifuge capacities? This would eliminate a big hurdle for both the centrifuge manufacturer and his customer.

Ordinarily, centrifuge capacities are given in terms of gallons/minute. But this is largely meaningless because the figure varies greatly, depending, among other things, on the materials being separated and their concentrations. A customer looking at manufacturers' literature would be hard put to find which model of a De Laval, say, or a Tolhurst, would be competitive with a Sharples.

A logical solution appears to be to pick a standard separation, specify concentration, particle size and other variables and then quote. "We've tried that a number of times," says Tom Little, director of engineering, "but we've never been able to come up with anything very satisfactory. One difficulty is that it's hard to get reproducible results with even the most standard compositions."

Sharples likens the problem to that of the customer buying an air conditioner: he reads capacities in horsepower or tons, when what he really wants to know is how many Btu's



CW PHOTO—ED WALLOWITCH

Sharples' Ambler develops measure of centrifuge-performance.





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## PRODUCTION

the unit can remove in a given period of time.

Ambler likes to compare it to a distillation column. The design engineer can calculate the number of theoretical plates for a separation, then predict performance from plate efficiency values. "The Sigma value," he says, "is comparable to the number of plates—the theoretical capacity. The efficiency of the machine will determine performance. Since efficiency doesn't vary very much for the same type of centrifuge, the customer has a quick and easy way of comparing the models of different manufacturers."

**What's Sigma?** What Sigma does is to relate the capacity of a centrifuge to that of a settling tank. Since the work that a settling tank is capable of doing is directly proportional to its surface area, Ambler decided to adopt a settling tank of a given surface area as "one Sigma." Unit chosen: 1,000 sq. meters. It means that Sharples' new DH-6—with a Sigma of 92—has the same theoretical capacity as a settling tank with a surface area of 92,000 sq. meters.

It's possible to calculate the Sigma for a centrifuge with a high degree of accuracy. Controlling factors are the integrated centrifugal force across the liquid and the length of the path of travel for the sedimenting particles.

The nature of the derivation and comparison gives Sigma some limitations, of course. It is next to useless for comparing centrifuges whose configuration is fundamentally dissimilar. It's applicable only to sedimentation-type centrifuges (as opposed to basket machines, which perform a certain amount of filtration). A rule of thumb: it's most useful on liquid clarification in a solid bowl centrifuge, somewhat less reliable for comparing disc centrifuges; it doesn't apply to the drying of solids.

Sharples is well aware of Sigma's limitations; but after using it for 11 years, the company is convinced the advantages far outweigh any disadvantages. Ambler himself has no illusions that the idea is perfect. He would like to see more work by others in the field so that the concept might be polished and perhaps, someday, be perfected.

In the meantime, he looks on it as a tool for both design and sales, when properly applied. "But it can,"

he warns, "become worthless or even destructive when they are not used properly."

**Competitive Comments:** Even among Sharples' competitors, there's general agreement that a universal yardstick for rating centrifuge capacities would be helpful. Says Tolhurst's C. W. Smith: "Every centrifuge manufacturer has developed or is developing some kind of mathematical correlations such as Sharples' Sigma concept with which to evaluate, scale up and compare its equipment. Such correlations exist for other types of equipment and are needed for centrifuges." He points out that Sigma is useful only for medium and high-speed machines. Tolhurst, which specializes in low-speed equipment, basket and continuous centrifuges feels that more work is needed in its field.

Two other firms prefer not to comment on competitor Sharples' work, but see merit in the idea generally. In fact, the only area of disagreement centers on just what formula should be employed. One manufacturer says it uses "dynamic factors," which allow prediction of solids drying as well as liquid clarification. De Laval has no quarrel with Sharples in principle but feels that its own system is more reliable.

Whose system is used or what it's called doesn't matter to the customer, of course, so long as it offers him a reliable yardstick. Such a device wouldn't solve all his centrifuge-buying problems, because capacity is merely one of the factors to be considered. But it would put some science and simplicity in an area that needs it badly.

## EQUIPMENT

**Teflon Hose:** Teflon hose in diameters up to 3 in. is now available from Manhattan Rubber Division of Raybestos-Manhattan, Inc. (Passaic, N.J.). Its previous maximum size was 1 1/4 in. The Flexlon hose is designed for temperature applications up to 325 F.

• Another new Teflon hose is the Springfield "400" line of Titeflex, Inc. (Springfield, Mass.). The inner tube is Teflon and Teflon-coated Fiberglas tape, die-compressed and sintered into a homogeneous unit. Available in diameters from 3/4 to 2 in., the hose is said to be extremely flexible, resist-



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## PRODUCTION

ant to -65 to 400 F temperatures.

**Insulating Tape:** For taping irregular contours, Quaker Rubber Division of H. K. Porter Co. (Tacony & Comly Sts., Philadelphia 24) now offers a new Type PDG electrical insulating tape. The tape has a polyester warp and fiber glass filler, with a silicone coating on one or both sides. Main improvements over existing tapes are said to be: 15% elongation, no abrasion between warp and filler threads, excellent "conformability." In addition, cost is claimed to be lower than all-glass tape.

**Lined Valves:** Hills-McCanna Co. (4600 West Touhy Ave., Chicago 30) is now marketing diaphragm valves lined with Penton. Suitable for use up to 300 F, the new line includes sizes from 1/2 to 6 in.

• Lined with gum rubber or neoprene for use with abrasive and corrosive slurries is the new Model C control valve offered by Clarkson Co. (564 Market St., San Francisco 4). Air or hydraulically operated, the valves are available in 1 1/2-, 2-, 3- and 4-in. sizes.

**Gauge Hole Cover:** Designed for vapor conservation is the new Figure 5008 gauge hole cover of Shand and Jurs Co. (Berkeley, Calif.). Base seat is stainless steel facing, while the steel plate cover has a flexible, leakproof safety seal ring.

**Furnaces:** K. H. Huppert Co. (6840 Cottage Grove Ave., Chicago 37) has added to its KR Series of electrically heated high-temperature furnaces a new model called KR-Super, designed for operation up to 3100 F.

• Designed for use to 3000 F, at a vacuum of  $5 \times 10^{-5}$  mm. Hg, is a new internally resistance-heated furnace offered by High Vacuum Equipment Corp. (Hingham, Mass.). A temperature of 3000 F can be reached in 1 1/2 hours with 50-kw. input. Temperature can be controlled to  $\pm 10$  F.

• A miniature "instantaneous heat" furnace is to be demonstrated by A. F. Holden Co. (14341 Schaefer Hwy., Detroit 27) at the American Gas Assn. exhibition in Atlantic City Oct. 12-15. Featuring a temperature buildup to 1500 F in 2 1/2 minutes, the system is designed for rapid starting,

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## PRODUCTION

cooling and restarting. Temperatures up to 2300 F are said to be obtained, with a 40% saving in fuel.

• **Ceramic tubes** for radiant-heat furnaces are now available in larger sizes from McDanel Refractory Porcelain Co. (Beaver Falls, Pa.). Now sold are tubes measuring up to 72 in. in length, 2 to 4 in. in diameter.

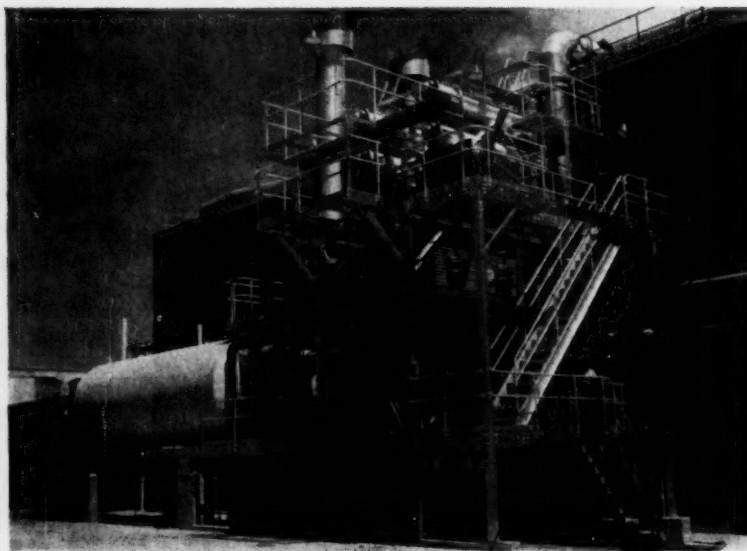
• **Electric Controls:** Minneapolis-Honeywell Regulator Co.'s industrial products group (Fall River, Mass.) is out with a full line of electric and electronic instrumentation to supplement its line of pneumatic controls. More than 20 major types of instruments make up the system, called the ElectriK Tel-O-Set. Units and subassemblies are interchangeable and may be linked to virtually any existing pneumatic systems.

• **Torquemeter:** A new torquemeter that covers a range of 5-250 oz.-in.

is now offered by Metron Instrument Co. (432 Lincoln St., Denver 3). Dynamic torque of shafts turning at 50-12,000 rpm. may be measured with an accuracy within 2% full scale, Metron claims.

• **Level Gauge:** Radiation Counter Laboratories (Skokie, Ill.) is offering a continuous-level gauge, Model 40104. Based on the variations of radiation received from a tank float, the gauge gives continuous depth or volume readings of the levels of liquids in totally enclosed containers.

• **Two-Pen Recorder:** Swartwout Co. (18511 Euclid Ave., Cleveland 12) has added to its line of Autronic process control instruments a two-pen, all-electronic recorder. As an optional feature, the new recorder can be furnished with a control set point or alarm contacts, or both, for one of the variables.



## Packaged Unit for Solvent Recovery

Now in operation at Celanese Mexicana's Ocotlan, Mex., rayon plant is the largest preassembled activated carbon solvent recovery plant ever supplied by Union Carbide Olefins Co.

The unit, used to recover acetone, was assembled in this country, partly dismantled and shipped in sections for

quick installation. Carbide supplied its first preassembled unit about eight years ago, now supplies about 35% of the packaged plants in this time-saving fashion. The Celanese Mexicana unit has a capacity of 17,000 cu.ft./minute air flow, and Carbide predicts even larger preassembled units in the future.



# You Will Say

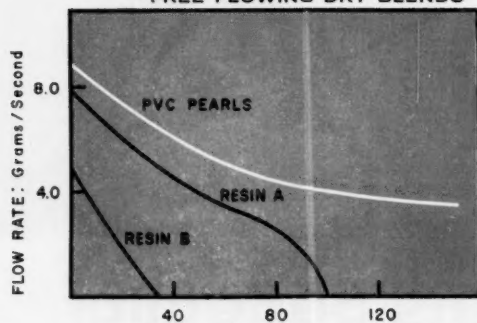
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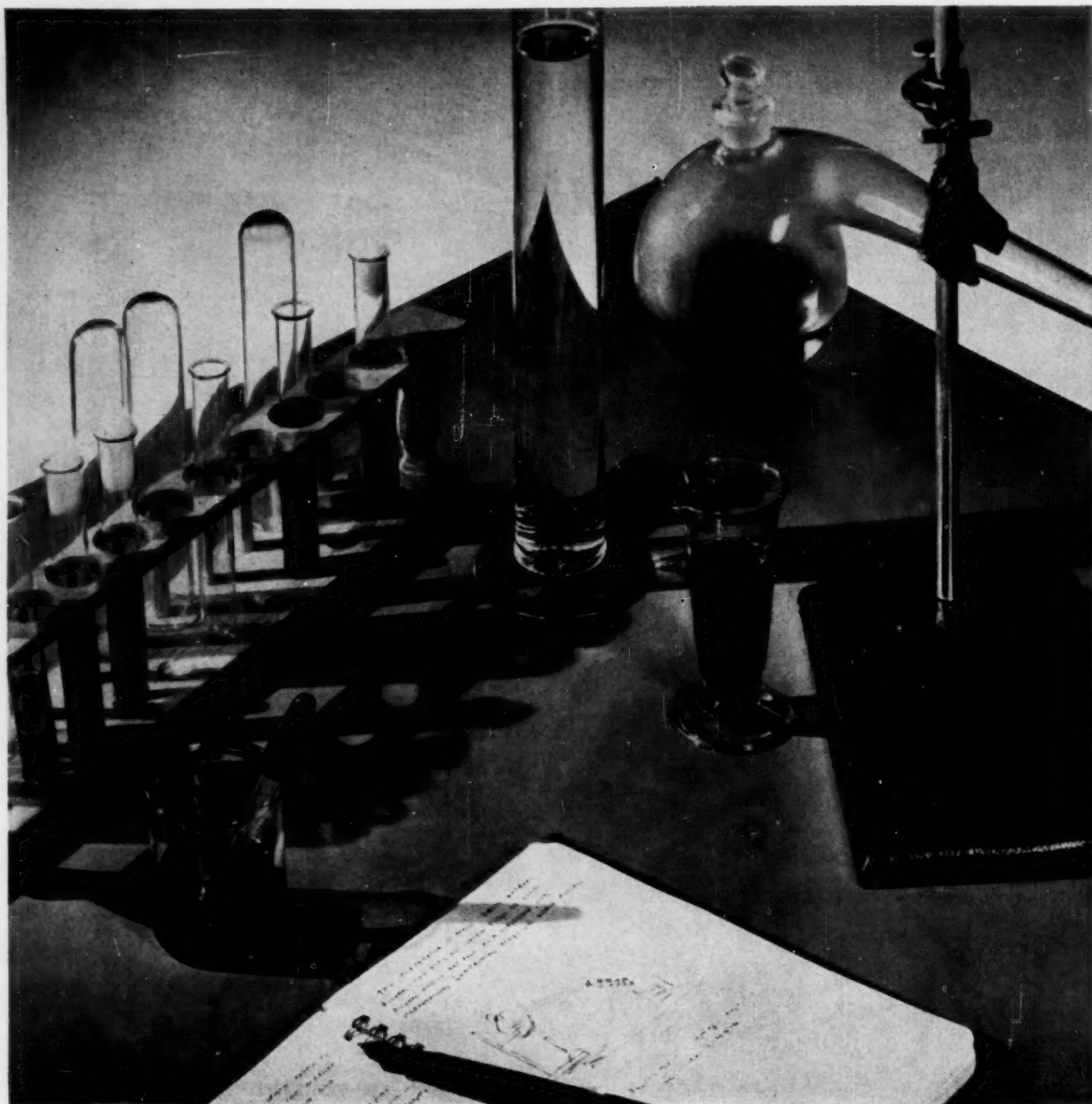
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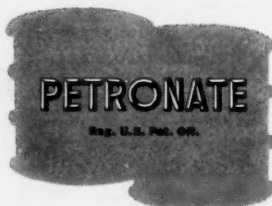
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# RESEARCH

## ***New Instruments for Research***

Instrument	Typical Use	Manufacturer or Distributor
Absolute Light-Scattering Photometer *	Determinations of particle sizes down to submicrons	American Instrument Co., Inc. (Silver Spring, Md.)
Multichannel Scintillation Spectrometer	Rapid determinations of radioisotopic mixtures	Baird-Atomic, Inc. (Cambridge, Mass.)
Automatic Amino Acid Analyzer	Protein research	Beckman Instruments, Inc. (Palo Alto, Calif.)
Model K-5 Kromo-Tog	Chromatographic analysis of materials boiling above 475 C	Burrell Corp. (Pittsburgh)
Techne CM Two-Circle Optical Goniometer	Identification of crystals	Arthur S. LaPine and Co. (Chicago)
Model II Glossmaster	Measuring ASTM gloss units of paints, etc.	Manufacturers Eng. & Equip. Corp. (Hatboro, Pa.)
Micro Vapor Pressure Apparatus	High-speed, highly accurate vapor-pressure measurement	Fisher Scientific Co. (Pittsburgh, Pa.)
Spectro-Electro Titrator	Automatic and multipurpose titrator	E. H. Sargent & Co. (Chicago)
Pressurized Paper Chromatography Column	Separating complex chemical mixtures	Ivan Sorvall, Inc. (Norwalk, Conn.)
Avisco Pliability Tester	Moisture content of films	F. F. Slocumb Corp. (Wilmington, Del.)

## **Introducing Automation To The Laboratory**

This week, it's an automatic titrator. Next week, it may be a rapid-working spectrometer. Add them to the growing list (above) of recently developed apparatus for industry's research and control labs—and you understand why — as automation comes to the laboratory—the equipment bill will soar to an estimated \$300 million this year.

Taken by itself, the tab seems high. But as most lab directors have learned, the payoff can be substantial—in timesavings, laborsavings and increased precision.

Several cases in point are high-

lighted by devices introduced in the past few months:

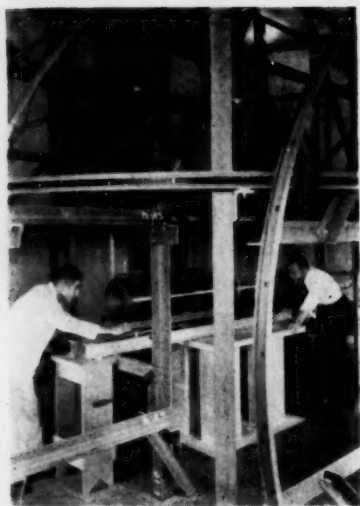
- The Chemalyzer, marketed this week by Florida Instrument Co. (Philadelphia), a division of Milton Roy Co. It's claimed to permit "untrained operators . . . to make tests that formerly required skilled technicians . . . make them with fool-proof accuracy in a fraction of the time formerly required."

- Model 104 Nuclear Magnetic Resonance (NMR) Analyzer, made by Schlumberger Well Surveying Corp. (Ridgefield Instrumentation Division (Ridgefield, Conn.)). It permits

moisture determination on dextrin in 3-6 minutes, compared with four hours by oven drying.

- An automatic amino acid analyzer, made by Phoenix Precision Instrument Co. (Philadelphia). It's said to offer "tremendous" time- and laborsaving in the separation and quantitative identification of protein hydrolysates.

**Combinations Too:** Multiple units have recently been devised that offer the same sort of savings. Fully automatic instruments that perform complicated chemical analyses (some involving as many as 20 different steps)



NBS apparatus used to redetermine proton gyromagnetic ratio.

were exhibited at the National Chemical Exposition last month in Chicago. They were shown by Baird & Tatlock (London) Ltd., the manufacturer, and Chicago Apparatus Co., the American distributor.

These instruments (which really are instrument systems) cost \$15-50,000, depending on the complexity of the chemical assays they are expected to handle. The Chemalyzer, for example, costs less than \$350, which its manufacturer says is one-third the price of the least expensive precision unit currently available. Baird and Tatlock's big instruments (called An-almatic) are at the other end of the scale.

**Manpower Motivated:** There is more than an economy-motivated reason for installing the complicated new instruments. James Bengston, president of Chicago Apparatus, ascribes the onrush of automation in the laboratory to the shortage of skilled scientists—"the limiting factor in scientific research." He goes on: "We couldn't begin to conduct research and quality control projects on the scale we do today with equipment we had even 10 years ago."

But automatic instruments can't do everything. Bengston points out that the sale of laboratory glassware has grown considerably over the past few years, indicating that a lot of lab work is still done "by hand."

Perhaps more important than time- and laborsavings has been the devel-

opment of new principles of instrumentation, and the greater precision they permit. Great progress is being made in extending the range, versatility and precision of instruments. For example, Battelle Memorial Institute (Columbus, O.) has built a new mass spectrometer, especially adapted to the study of vapors at high temperatures. It is useful at 2000 C, is particularly suited to studying the thermodynamics of high-temperature systems involving metals and ceramics.

At National Bureau of Standards, new research on the proton's gyromagnetic ratio is expected to be useful in the design and development of scientific and industrial apparatus in which it is important to regulate the spatial distribution of a magnetic field. The bureau has turned up a new value for the ratio (a fundamental physical constant), a measure of the proton's interaction with magnetic fields.

The new value means that a convenient standard is available to industry for measuring magnetic fields in mass spectrographs, beta-ray spectrometers, etc., and should lead to higher precision in such equipment.

**Competition Growing:** Right now, instrument research is headed in two directions, according to Emery Rogers, manager of field engineering for Varian Associates' instrument division (Palo Alto, Calif.). He expects totally different instruments, as well as improved versions of those now in use, to emerge from this work. Varian is working exclusively in the field of instruments based on nuclear magnetic resonance (*CW*, March 8, p. 51) and electroparamagnetic resonance. Both principles were discovered after World War II.

Either way, the outcome of instrument research and development has important consequences for U.S. instrument makers. The U.S. market for foreign-made scientific equipment is expanding. England and West Germany, moreover, are strong in the engineering of special instruments demanded by the automation trend.

**Sure Gainers:** In any case, the lab man stands to gain. Whether or not to invest in better lab tools is, of course, a matter of individual economics. But, in general, research management is seeking to modernize its equipment wherever possible (*CW*, Oct. 11, p. 66). And that applies to

small and medium-size companies, as well as the big ones. Airkem, Inc. (New York), for example, has spent \$50,000 in the past year and a half on instrument and lab modernization. Its annual research budget is \$225,000; consolidated '57 sales were \$3,064,210.

Instrument makers foresee no immediate letup in the flow of new equipment. So long as scientists are in tight supply, they reason, a hospitable reception awaits almost any device that can augment the researcher's skills while freeing him from routine chores.

## EXPANSION

- Hanson-Van Winkle-Munning Co. (Matawan, N.J.) has begun operations in its new electrochemical laboratory at Matawan, will continue emphasis in nickel plating.

- Microchemical Specialties Co. (Berkeley, Calif.) has moved to new quarters (1825 Eastshore Highway) in Berkeley. The firm specializes in glass and quartz ultramicroapparatus.

- Copolymer Rubber and Chemical Corp. (Baton Rouge, La.) opened its new research laboratory this week. Copolymer is owned jointly by seven firms: Dayton Rubber Co., Gates Rubber Co., Mansfield Tire & Rubber Co., Armstrong Rubber Manufacturing Co., Seiberling Rubber Co., Armstrong Rubber Co. and Sears, Roebuck and Co.

- Ground has been broken for a new biology wing to Sterling-Winthrop Research Institute (Rensselaer, N.Y.).

- Textile Research & Development Corp. (Asheville, N.C.) is a new firm specializing in the testing of wash-and-wear garments.

- American-Marietta Co. (Seattle, Wash.) is starting construction of a \$1-million synthetic resins research center.

- The Wm. S. Merrell Co. (Cincinnati, O.), division of Vick Chemical Co., has dedicated new medicinal chemistry laboratories costing almost \$1 million.

- National Dairy Products Corp. will build a two-story laboratory adjacent to its Glenview, Ill., research facilities.

- Texas Instruments, Inc. (Dallas, Tex.) plans completion of a new \$3-million central research laboratory by early '59.



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<b>CHEMSTRAND CORPORATION</b> Pensacola, Florida	300 tons per day
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<b>PHILLIPS CHEMICAL COMPANY</b> Etter, Texas	120 tons per day
<b>POTASSE &amp; ENGRAIS CHIMIQUES</b> Grand Couronne, France	150 tons per day
<b>SOCIETA ITALIANA EDISON</b> Sicily, Italy	500 tons per day
<b>SPENCER CHEMICAL COMPANY</b> Vicksburg, Mississippi	120 tons per day
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<b>STANDARD OIL COMPANY OF CALIFORNIA</b> Richmond, California	250 tons per day
<b>THE STANDARD OIL COMPANY OF OHIO</b> Lima, Ohio	180 tons per day
<b>TENNESSEE VALLEY AUTHORITY</b> Wilson Dam, Alabama	120 tons per day
<b>THE TEXAS COMPANY</b> Lockport, Illinois	200 tons per day
<b>U. S. INDUSTRIAL CHEMICALS COMPANY</b> Tuscola, Illinois	120 tons per day
<b>PAKISTAN INDUSTRIAL DEVELOPMENT CORPORATION</b> Multan City, West Pakistan	200 tons per day

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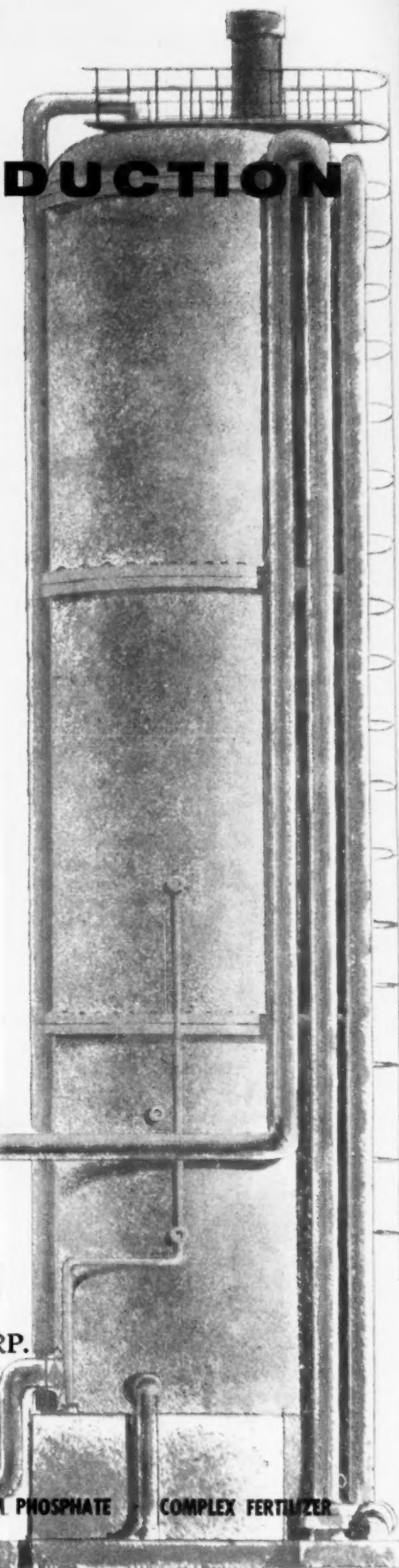


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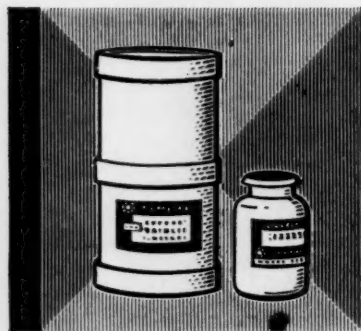
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## RESEARCH

• Haloid Xerox, Inc. will build a \$3-million research center in Webster, N.Y. It is expected to be ready by early '60.

## PRODUCTS

**Standard Iron Samples:** Eight new samples of low alloy steel and ingot-iron are available from the National Bureau of Standards, (Washington, D.C.). They have been analyzed and certified for 17 elements, are designed for control of composition in the iron and steel industry and for analysis of finished products. The new samples are the first to be certified for carbon and phosphorus.

• **Polyether:** Atlas Powder Co. is out with a new polyether, developed from sorbitol and propylene oxide. Polyethers may pose strong competition to polyesters in the production of urethane foam products—although no price has been set on this latest entry, most polyethers are 10-15¢ less than polyesters.

• **Thulium 170:** Isotopes Specialties Co. (Burbank, Calif.), division of the Nuclear Corp. of America, offers thulium-170 as a new radiation source. The isotope is a soft gamma-ray emitter, requires lightweight shields. The major earlier objection to its use, a large focal spot, has been removed. Pure thulium metal (99%) is a new entry of another NDA subsidiary, Research Chemicals Inc. (Burbank, Calif.). A rare earth, thulium is useful as a radiographic source.

• **Fluoro Monomer:** Perfluorobutene-2 an unsaturated organic monomer is the latest entry of Halocarbon Products Corp. (Hackensack, N.J.). It's said to copolymerize with other monomers, is being studied as a modifier of special polymers. Availability: 150-lb. and 1-ton cylinders, net.

## APPARATUS

**Lab Sink:** Duriron Co. (Dayton, O.) has developed a new line of corrosion-resistant laboratory sinks from modified epoxy resins. Called Durcon Laboratory Sinks, they are reportedly 60% lighter in weight than competitive products, impermeable to

liquids and resistant to heat, corrosion and shock. Twelve standard sizes are offered.

• **Cold Chest:** American Instrument Co., Inc. (Silver Spring, Md.) is now offering a newly modified, dry ice-operated, subzero cabinet with a temperature range of 200 F to -120 F.

• **Culture Aid:** American Sterilizer Co. (Erie, Pa.) is out with a new apparatus called Biogen for growing large quantities of bacteria, yeasts, moulds and other microorganisms.

## LITERATURE

• Will Corp. (Rochester, N.Y.) is out with a new catalog on plastic laboratory ware. Tables indicate which plastics to select under specific conditions.

• Free copies of a new brochure describing is environmental testing facilities (temperature extremes, sand and dust, humidity, fungus, salt spray, shock, altitude, explosion, etc.) are available from Bowser-Morner Testing Laboratories, Inc. (Dayton, O.).



## Computer Eases Drug Data-Handling

Merck Sharp & Dohme is using this new IBM 650 magnetic-tape computer to tabulate clinical results of treatments with its new Decadron steroid. The machine can scan reports on 8,500 patients in less than 10 minutes. Shown above are Augustus Gibson (*right*), executive director for medical research; Controller Herbert H. Blevins, (*center*); and Robert Funk (*left*), of the data processing department. Pfizer also reports using a computer in screening antitumor agents.

# AMSCO IS FIRST



..... **.. in solvent research**

*(no wonder it's first in sales)*

Chances are one or more of the petroleum solvents you're using today was first developed by AMSCO. AMSCO, in the past 35 years, has developed many new solvents, either for general industrial use, or to suit the specific need of a single industry or manufacturer.

This record has made AMSCO first in new product development.



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inert strength...

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resins

Chemically inert and color stable, **Piccolastic Resins** provide a tough and versatile thermoplastic material where outstanding water and chemical resistance are required.

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Clairton, Penna.



## Boost Your Margin of Profit on Every Bag

...through  
**AUTOMATED  
ACCURACY**  
by  
**Richardson**

### CUT PRODUCT GIVEAWAY

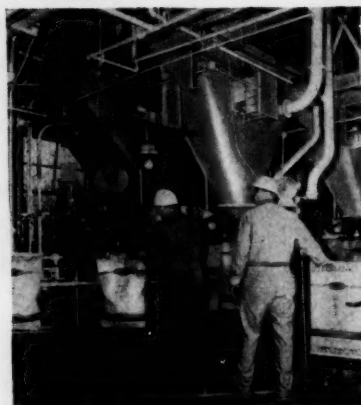
More than \$10 per hour can be your margin of loss when inaccurate scales force you to set mean bagging weights too high in preventing short-weights. Efficient Richardson bagging scales give you unsurpassed accuracy of  $\pm 1$  to 2 oz. or better.

### CUT LABOR COSTS

Eliminate marginally-productive labor costs with *automatic* Richardson bagging equipment. Shift labor to more profitable production by installing Richardson automatic feeders, sewing conveyors, bag holders and packers.

Richardson Scales conform to U.S. Weights and Measures H-44 for your protection.

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MATERIALS HANDLING BY WEIGHT SINCE 1902



Versatile Richardson E-50 Bagging Scale can turn out 10 100-lb. bags per minute... gives amazing accuracy in bagging dry chemicals. Others available in bagging range 25-250 lbs.

Lower operating costs, quality control, higher production in proportioning systems are Richardson specialties. Write today for full data on Richardson bagging scales for the Chemical Processing Industries.

**RICHARDSON SCALE COMPANY**  
Clifton, New Jersey

Sales and Service Branches in Principal Cities  
Also manufactured in Europe to U.S. standards

## RESEARCH

## REPORTS

These reports are available from Office of Technical Services, U.S. Dept. of Commerce, Washington, D.C.:

- Three catalogs of technical reports in the field of titanium, listing all reports of research into the metal and its alloys, carbides and compounds. They are "Titanium—Part I: Titanium and Alloys, 1930-58" (CTR-349, 10¢); "Titanium—Part II: Titanium Carbides and Compounds, 1920-58" (CTR-350, 10¢); "Titanium—Part III: Barium Titanate, 1946-58" (CTR-351, 10¢).

- "Studies on Organic Fluorine Compounds, Vol. 3" reports the results of a study into the thermochemistry of that group, provides information on heats of chemical reaction and bond energies (including their variation among compounds). The work was done for the Navy at University of Colorado (PB 121702, 296 pages, \$5.50).



### Hot Running Lube Tester

For Air Force high-temperature lubricant research, this new machine at Southwest Research Institute (San Antonio, Tex.) whirls special hot (1200 F) tool steel bearings at 10-15,000 rpm. Ludwig Motulsky, senior research engineer, guides shakedown tests. Another new institute machine achieves speeds of more than 100,000 rpm. These studies are in connection with development of improved lubricants for missile bearings.



# MAN BITES DOG



*...and finds it fresher,  
thanks to cellulose*

**T**HE popular "hot dog and bun" are just two of the thousands of products now protected and glamorized by cellulose-based films.

From Buckeye Cellulose Corporation comes much of the basic ingredient that goes into cellophane, cellulose casings, and other packaging materials preferred by manufacturers for showing, identifying and protecting their products.

As industry's oldest producer of cellulose, and one of its largest, we have worked hand-in-hand with many companies in the cellophane, textile, tire cord, plastics, film, paper and other industries using cellulose. Frequently we have helped them raise product quality and

cut costs, and we would welcome the opportunity to talk to you along these lines.

Buckeye has built a solid reputation for quality and dependability. When you team up with Buckeye, you benefit from almost 40 years' experience with manufacturers of cellulose-based products. Our research laboratories and modern plant facilities are at your service.

BUCKEYE CELLULOSE CORPORATION  
MEMPHIS 8, TENNESSEE

*Cotton linters pulp plant at Memphis, Tenn.  
Wood pulp plant at Foley, Florida*

*CELLOPHANE and CELLULOSE CASINGS are two  
of the remarkable products made from Buckeye Cellulose*

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 **first in  
cellulose**

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A-1 co Midn  
tution. Fanni  
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dev. to \$8500  
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Automotive	Pharmaceutical
Aviation	Plastics
Building	Surface Coatings
Electrical	Textiles



# Technology

## Newsletter

CHEMICAL WEEK  
October 11, 1958

### Hyperpure nickel will soon be available in pilot-lot quantities

from U.S. Bureau of Mines (Salt Lake City). Improved equipment and extraction techniques, the bureau reports, have yielded laboratory quantities of nickel "containing less than a few parts per million of cobalt." (For comparison, specification-grade nickel for industrial applications contains up to 1% cobalt.) The scaled-up pilot facility will have a capacity exceeding 1 ton/day of feed, equivalent to about 20 lbs. of hyperpure nickel.

Key to the high purity is a solvent extraction process based on amine extraction of hydrochloric acid solutions of nickel and cobalt. Tri-iso-octylamine, the bureau reports, has been found particularly effective. Cobalt recovered as a coproduct of the hyperpure nickel is also extremely pure, contains no chemically detectable nickel. The new pilot plant will turn out about 1 lb./day of cobalt.

•  
A safer sulfa drug has been introduced by Hoffmann-LaRoche (Nutley, N.J.). Called Madribon, it is 2,4-dimethoxy-6-sulfanilamido-1,3-diazine. Tests on nearly 5,000 patients show little likelihood that Madribon will cause crystalluria or kidney damage, the firm says. The compound is indicated for upper respiratory and urinary tract infections, and against meningitis, rheumatic fever.

•  
A new fumigant, hydrogen phosphide, is reducing stored wheat losses in experiments at University of California (Riverside). The gas reportedly is effective against all the insects (e.g., confused flour beetle, Khapra beetle) that cause an estimated \$500 million/year grain damage in the U.S. Developed in Germany, hydrogen phosphide is already being used commercially in several other wheat-exporting countries, reportedly penetrates well and has no effect on wheat germination or flavor. Easily handled tablets, which decompose in the presence of moisture, form hydrogen phosphide at the site where needed.

•  
Other new gains in the biological war against crop pests include use of a microorganism, *Bacillus thuringiensis*, against the tobacco hornworm, the corn budworm and earworm, and the cabbage worm. Kentucky Experiment Station (Lexington) entomologists have done much of the research.

And at the University of California's College of Agriculture (Berkeley), researchers are working on ways to keep *thuringiensis* and other "living insecticides" alive for commercial use.

•  
The first commercial cationic starch is being exhibited at the Southern Textile Exposition now under way in Greenville, S.C. Called Cato starch, and made by National Starch Products, Inc. (New York),



# Technology

## Newsletter

(Continued)

it's especially suggested for sizing Dacron blends and other synthetics that carry a negative charge on their fibers.

•  
**A new process for coating cast iron with tin** has been developed by Tin Research Institute (Greenford, Middlesex, England). Called the direct chloride method, it involves preparation of castings by blasting with superfine grit and use of a special, inexpensive tinning flux. It's reportedly useful in tinning food-handling equipment when a smooth hygienic coating is required.

•  
**New superconductors** (materials that allow electricity to flow at apparently undiminished strength) have been turned up by Westinghouse. They are intermetallic compounds of uranium with either cobalt, manganese or iron. The latter two metals, heretofore, have been considered "alien" to superconductivity, says Westinghouse. While the firm's tests were run near -459 F, it is looking for superconductors that work at "reasonably high temperatures." Object "electric and electronic devices not now even visualized."

•  
**Beer in aluminum cans is on the way.** Adolf Coors Co. (Golden, Colo.) plans to market draft beer in 7-oz. aluminum cans by the first of the year. Unlike other canned and bottled beer, the product won't be pasteurized. Instead, Coors will use a sterile filling operation that preserves the draft-beer taste while preventing spoilage during storage.

•  
**Husky Oil Co. is taking oil out of tar sands** at a novel pilot plant in Santa Cruz, Calif. Concentric pipes—2 in. and 4 in. in diameter—are sunk into the sands. Inside the center pipe is a gas or oil burner that heats the tar sands to about 600 F, producing oil vapors that rise in the space between the pipes, condense and are collected.

The technique is a modification of the Swedish Lins process, which uses electric-resistance heaters for extracting oil from shale (*CW*, Sept. 13, p. 80). Husky says it's much too early to predict the economics of the process. But it is producing 13 bbls. of oil daily and observes that California tar sands (leaner than some deposits elsewhere in the U.S. and Canada) might yield 15,000 bbls./acre of crude.

•  
**A new urethane developed by Dunlop Rubber Co. Ltd.** (Manchester, England) is said to be particularly suitable as a replacement for cast iron in gears and pulleys, for metal components requiring fatigue resistance, and for hard-to-lubricate metal bushings. Physical properties claimed for the product, called Duthane, are a tensile strength of 6,000 psi, an abrasion resistance five times that of rubber-tread stock, and elongation at break of 750%.



# This Plastisol Coating **LOWERS SHIPPING COST** of Corrosive Chemicals

Here's a new way to cut costs . . . now, plastisol-coated steel drums can save you money by replacing more expensive glass, ceramic, and plated steel containers for aggressive chemicals. **BAKELITE** Brand Vinyl Dispersion Resins are used to make this tough lining which defies corrosive attack.

Fabrication costs are low because vinyl plastisol is a simple, spray-on coating. Baking converts it to a thick, resilient hide that chemicals can't eat through, scratch, puncture, or abrade. Continued re-use over long periods makes the drums pay for themselves in savings. All sizes of drums, from 5 to 50 gallons, are also being coated with this material.

All this economy is based on one factor—plastisols made from **BAKELITE** Vinyl Dispersion Resins provide superior protection against corrosion.

*Bakelite Company will help you find the answer to your corrosion problems. Learn about the ease of application, low cost, and long life of plastisol coatings, and how they can save money for you. Write Dept. JA-24L, Bakelite Company, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.*

**BAKELITE**  
BRAND  
**PLASTICS**



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**BAKELITE COMPANY**, Division of Union Carbide Corporation, 30 East 42nd St., New York 17, N. Y.  
In Canada: **BAKELITE COMPANY**, Division of Union Carbide Canada Limited, Toronto 7



## **TOUGH PLASTISOL COATING**

...based on **BAKELITE** Brand Vinyl Dispersion Resins, provides a resilient, smooth-surfaced lining that protects against attack by:

**acid cleaners**  
**phosphoric**  
**metal cleaners**  
**sulphonate detergents**  
**45% lactic acid**  
**in water**  
**sodium hypochlorite**  
**solution**  
**(reagent quality)**

# SAFETY!

**General American  
terminal keeps  
alcohol under  
"lock and key"!**

Ethyl alcohol is a "problem" liquid when it comes to storage because close Federal tax supervision holds producers accountable for every gallon. A major producer who stores alcohol in General American's Carteret terminal doesn't have this problem—General American assumes it for him.

In addition to storage, the terminal provides a variety of services—metering, blending, diluting, denaturing and packaging—all provided with the necessary accountability and accuracy that solves a difficult marketing problem.

If you have a storage problem involving hard-to-handle liquids, call on General American. Leased terminal facilities give you the privacy, safety, flexibility and service of your own terminal—*without capital investment on your part*. Phone or write today. You'll find . . . *it pays to plan with General American.*



Six terminals at five key-market locations with over 14,000,000 barrels capacity: PORT OF NEW YORK (Carteret, N. J.), PORT OF NEW ORLEANS (Good Hope, La.), CHICAGO, ILLINOIS (Bedford Park), PORT OF HOUSTON (Galena Park and Pasadena, Texas), CORPUS CHRISTI, TEXAS.



**GENERAL AMERICAN TANK STORAGE TERMINALS**  
a division of GENERAL AMERICAN TRANSPORTATION CORPORATION  
135 South La Salle Street • Chicago 90, Illinois

## Knighthood: Purchasing Man's Wish?

Something akin to industrial knight-hood—stature in the eyes of management—is the basic quest of purchasing agents, motivation researchers find.

Disclosing for the first time survey results of over 100 depth interviews, Dow chemical has turned up many a revealing insight into buyers' basic psychological needs and drives, how they view themselves and their suppliers, and how salesmen can satisfy both the rational and the emotional needs of purchasing agents.

Motivation research has won an impressive list of users in recent years. And it has been successful in moving huge quantities of consumer products—just about everything from prunes to soap. But the psyche probers have been less active in industrial fields. Moreover, few purchasing motivation studies have ever been revealed. That's why the Dow data are of unique significance to chemical management. Dow's study covers a wide cross-section of chemical-using industry and both large and small concerns.

The survey strongly indicates that purchasing agents are highly normal individuals but with attitudes colored by the nature and pressures of their position. Purchasing men have been fighting a long, uphill battle for management recognition. Striving for professional character, buyers have worked hard to dispel the notion that purchasing is the refuge of people unsuccessful in other business areas.

More so than many other groups, purchasing men seek to build stature for the profession and themselves. One indication: the dislike of lavish gifting and entertainment. To many, it's akin to tipping—a minor bribe. Attempts to bypass purchasing—either by salesmen or by bringing pressure from above to bear on the buyer—are espe-

BETTMANN ARCHIVE







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We mine Copper, Sulfur, Iron and Zinc and are basic producers of their chemical derivatives. Our technical know-how and basic position in these minerals is your assurance of exacting quality control, strict uniform consistency and a plentiful supply.

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## IRON

FERRIC IRON SULFATE

## ZINC

MONOHYDRATED ZINC OXIDE  
ZINC SULFATE

## MANGANESE

MANGANESE SULFATE MANGANOUS OXIDE  
MONOHYDRATED  
MANGANESE SULFATE

Samples, specifications and detailed information upon request.



TENNESSEE CORPORATION  
617-629 Grant Building, Atlanta, Ga.

## SALES

cially resented. These practices tend to decrease purchasing stature.

**Supplier Identity:** The corporate image of a supplier is almost totally that of his individual salesman. And significantly, no differences in the purchasing agent's image of the top major chemical suppliers were discernible. Conclusion: salesmen are much alike. Dow's market research department manager, Parker Frisselle, believes that it would be prohibitively expensive to build a distinct corporate image in the eyes of purchasing agents. But establishment of identity of belonging to the top group of suppliers can be developed by a company (*CW*, Oct. 4, p. 29).

Purchasing agents also show some fear of smaller suppliers—they fear their ability to hold price lines under inflationary conditions, meet delivery schedules, perform adequate research, development and technical service. Buyers logically look for strength in sources of supply.

**Self-Appraisal:** Rationalism dominates the buyer's mental picture of himself. Almost invariably, purchasing agents tell motivation researchers that buying decisions are coldly logical. The buyer always carefully weighs price, service, delivery, quality, labor relations, research and development. And he likes to think that purchasing decisions are not influenced in any appreciable degree by human relations. For most buyers, however, this rapid recital of purchasing ABCs betrays an inner, and hidden element of insecurity.

**Emotional Patterns:** Although fundamentally secure individuals, the typical buyer works under great tension of uncertainty. The worry "Am I right in this decision?" clouds the working day and produces much decision-centered insecurity. The buyer is keenly aware that he may make mistakes, may fail to satisfy production schedules or buy what is requested at the best price. Only a very few buyers, the survey reveals, have the confidence to be unconcerned about job performance.

Buyers quickly shy away from vagueness in a supplier's proposition. Lack of specificity about delivery, contract terms, packaging adequacy, for example, is unacceptable to the buyer. Most feel a great need for certainty and assurance that their course of action is correct. Minor

supplier mistakes (e.g., failure to answer a letter promptly) feed feelings of uncertainty, produce a reaction out of all proportion to its significance. The drive for certainty nails a buyer to the same supplier year after year.

The quest for stature shows in the purchasing agent's strong need to feel that his work is significant to the company and also creative. Many display an "I have to prove myself" attitude. Moreover, many feel "trapped" between two powerful giants.

On one side is his own corporation—demanding the best possible price, the fastest and cheapest delivery, unsurpassed product quality and perfect packaging. On the other side is the strong supplier—a titan striving for the highest possible price, delivery at his own convenience, and quality and packaging at a minimum level of acceptability. The purchasing agent must reconcile both viewpoints to the satisfaction of the supplier and particularly to his own company.

**Sales Stimuli:** The salesman who helps the buyer mesh those viewpoints helps him become a hero in the eyes of his own management. And it's that salesman that gets the business. The salesman must avoid vagueness in presenting ideas and propositions. The best sales presentation: the one that leaves no doubt in the buyer's mind, no uncertainty, no question of choice, one that is reassuring and that makes it easy for a buyer to reach a decision.

Stature-building also influences favorable decision. Calls by district managers and company executives and plant visits enhance the purchasing agent's sense of worth. Telephone calls confirming delivery and shipments contribute to a sense of security. A call once every three or four weeks and sincere interest in the buyer's problems satisfy the purchasing agent's need to feel needed.

**Man-to-Man:** What type of salesman makes the biggest hit? Purchasing agents classify salesmen into four categories:

- Overbearing. Forceful, strongly and overtly aggressive, this type is strongly resented. Some perhaps view the overbearing type as a threat to security. Few salesmen of large suppliers, however, fit this group.

- Oversolicitous. The "yes man" is disliked with equal intensity. Buyers suspect that the fawning type



**THE MAN WITH THE**



**MULTIWALL PLAN**



**UNION  
PACKAGING SPECIALIST  
GENE CARTLEDGE**

**helps  
Multiwall user  
reduce  
bag costs  
\$4.05 per M**

In Multiwall packaging, paradoxically, it's sometimes necessary to add in order to reduce. Take the case of one leading company whose bag designs recently were analyzed by Union Packaging Specialist Gene Cartledge.

The firm uses Sewn Open Mouth Multiwalls in part of its operation. Cartledge recommended adding Union's special SEW STRONG construction (reinforcing strips at top and bottom of bag). The stronger closure enabled the basis weight of each bag to be reduced by 10#. The new sewing method led to a reduction in bag length,

an improved bag design—and \$4.05 per M savings! Another recommendation: convert all the firm's

present Sewn Valve Multiwalls to Sewn Open Mouth types. This complete changeover will further streamline bagging and, based on the company's annual requirements, result in thousands of dollars in additional savings.

Every day, Union's 5-Star Packaging Efficiency Plan is helping packers like yourself

get more for their Multiwall investment. Yet it costs nothing to put it into action. Write today for complete details.

**Union Multiwall Recommendations  
are based on this 5-Star  
Packaging Efficiency Plan**



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**Better Multiwall performance  
through better  
planning**



UNION'S PACKAGE ENGINEERING DEPARTMENT will study your Multiwall bagging methods and equipment and make appropriate recommendations, regardless of the brand of Multiwalls you are now using.

**UNION MULTIWALL BAGS**

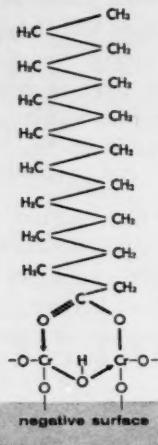
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233 BROADWAY, NEW YORK 7, N. Y.

IS THERE  
AN IDEA

HERE  
OR YOU?

BAGS for ice cubes resist moisture and bursting—won't stick to frozen cubes when treated with Du Pont "Quilon."

## DU PONT QUILON® chrome complex forms a monolayer on negatively charged surfaces . . . adds useful properties



A MONOLAYER of molecules of "Quilon" attached to a negatively charged surface radically changes the properties of that surface. Note the long "tail" of the molecule oriented upward. This part gives the surface its new properties.

What can you do with a chrome complex that unites with negatively charged surfaces . . . then "fends off" aqueous solutions from those surfaces?

Some chemists use "Quilon" as a size on paper for such products as frozen-food packages and bags, because it imparts excellent water repellency and "release" properties without changing paper's appearance, flexibility, porosity and strength.

Others find "Quilon" a useful treatment for leather to be used in gloves, work and safety shoes, because it reduces water and chemical damaging of the leather . . . adds service and comfort.

Still others apply "Quilon" as a highly effective insolubilizer for polyvinyl acetate and polyvinyl alcohol in paper-coating solutions. It also improves heat-sealing temperatures, toughness of the coating.

Your use for Du Pont "Quilon" may be one of these or a new, profitable use tailored to your own needs. Be sure to evaluate "Quilon" in terms of your own development work! Just write address given below for more information.



► Write for this new, free product information bulletin about "Quilon"—its properties and uses. E. I. du Pont de Nemours & Co. (Inc.), Grasselli Chemicals Dept., N-2533, Wilmington 98, Del.



BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

## SALES

don't always tell them the truth.

- Robot. Cold, factual presentations characterize the robot salesman. They take the attitude that the company, product and services are so good that the facts speak for themselves. Oddly, buyers neither like nor dislike this type. Robots, the survey showed, would go much farther if they "let their emotions out."

- Man-to-man. This salesman is not afraid to disagree with a purchasing agent and is capable of talking on a man-to-man basis. He is not only a technical specialist but also a specialist in social and emotional relations. Moreover, he takes the buyer's problems as his own. And if survey findings hold, he takes the order.

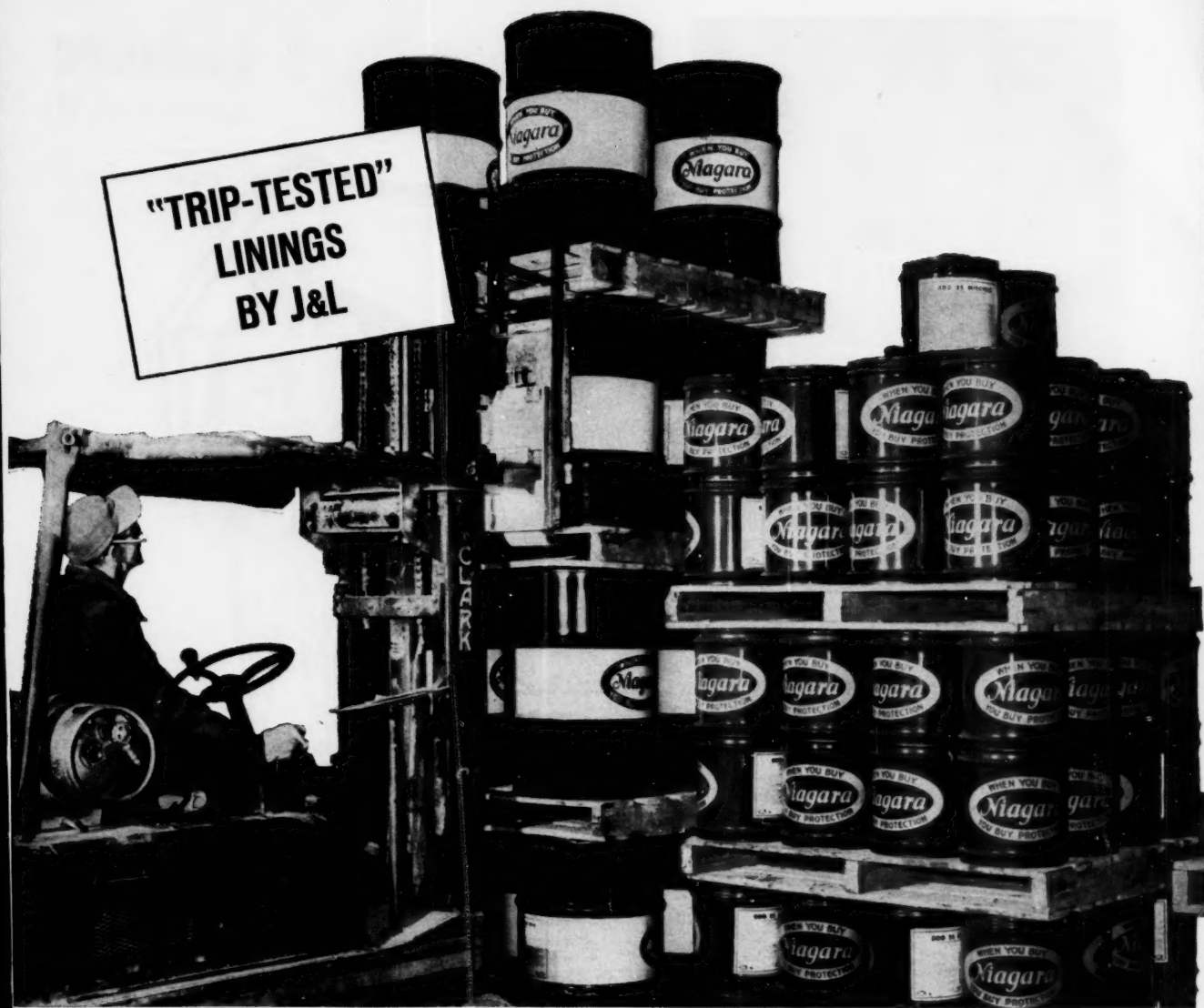
The reason isn't hard to fathom. For although the survey proves that emotional factors are important, they are no more so and perhaps less so than the cold logic of factual reasoning. Price, delivery and quality remain of great importance. The salesman that uses both has a decided edge. Emotional factors, however, become dominant when products and services are standardized, as is the case for many basic chemicals.

Final evaluation of the purchasing survey is not yet complete. Certainly, many of the initial findings come as no surprise to veteran sales managers. But they are welcome reassurance that sales departments are on the right track when they enhance the stature of purchasing, strive for certainty in sales presentations, and stress logical reasoning.

### 'What Sells Me'

The biggest educational venture of a chemical salesman's year—the annual sales clinic sponsored by Salesmen's Assn. of the American Chemical Industry—will take a practical slant this year. Scheduled for Oct. 20 at New York's Hotel Roosevelt, the clinic will stress two panel sessions on "grass roots" selling.

Purchasing agents will tell "What Sells Me." And in a companion panel, marketing executives will discuss "What Is Effective Selling?" In the morning sessions, program speakers will delve into "Sales as a Professional Career," "Why Chemical Distributors?", "What Salesmen Can Contribute to Market Development" and "Methods of Improving Sales."



## HOW J&L PIGMENTED PHENOLIC LININGS "Eliminate product spoilage for Niagara Chemical"

"Container corrosion has been eliminated by switching to J&L lined containers," reports Niagara Chemical Division of Food Machinery and Chemical Corporation. "The problem of product contamination, a common one when packaging liquid insecticides, fungicides and herbicides, has been solved by using these J&L trip-tested containers."

Extensive laboratory and "in transportation" tests conclusively prove that J&L tight-head drums and pails, lined with pigmented phenolic linings, are ideal containers for these specific products. They resist the corrosion properties of these acidic compounds.

Nine J&L container plants located near all major chemical and petroleum producing areas provide fast, round-the-corner service. J&L lined containers—over 2,500,000 in 1957—have carried thousands of chemical products safely to their destinations.

It will pay you to call in a J&L container specialist to discuss lining problems. Simply call the J&L Container Division, 405 Lexington Ave., New York (YU 6-6600); or call a J&L branch office at Atlanta; Bayonne, N. J.; Boston; Chicago; Cleveland; Kansas City, Kansas; Lancaster, Pa.; New Orleans; Philadelphia; Pittsburgh; Port Arthur; and Toledo.



**Jones & Laughlin Steel Corporation**

**CONTAINER DIVISION**

405 LEXINGTON AVENUE, NEW YORK 17, NEW YORK

# TECHNICAL SERVICE AT YOUR FINGER TIPS



## products of the SOLVENTS and CHEMICALS GROUP

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Petroleum and Coal Tar  
Chlorinated Paraffins  
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Ketones and Ethers  
Oils and Fatty Acids  
Plasticizers  
Resinates Sodium and Potassium  
Rosins Gum and Wood  
Stearates  
Terpene Solvents  
Waxes

WANT quick, helpful suggestions for the solution of technical problems involving solvents and chemicals? Call your nearby member of the Solvents and Chemicals Group. Here's why . . .

- 1 Each member maintains laboratory facilities to help serve industry as well as control quality and purity of incoming products.
- 2 Each group member has technically trained men familiar with problems in the industries they serve.
- 3 Each member is free to call on the technical departments of its nationally-known principals. Members welcome an opportunity to provide assistance on any bona-fide problem in the areas in which they serve.

Unbiased technical service is just one more reason for choosing Solvents and Chemicals Group members as your source of supply. Investigate this modern, time-saving, money-saving service that supplies what you want . . . when you want it . . . where you need it . . . all with just one phone call! Call your nearby Group member or write . . .

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# Market Newsletter

CHEMICAL WEEK  
October 11, 1958

**Are sulfur prices in for an increase?** The trade is still buzzing with speculation that a hike—perhaps as much as \$3/ton—will be announced soon.

This is despite a statement last week by Texas Gulf Sulphur's Fred Nelson, flatly discounting the possibility of an advance because of the rough competitive market in sulfur. "We're all fighting for customers," said the TG chairman.

Some ungentle maneuvering for customers is reported, for instance, via below-schedule offerings. Although book prices indicate a \$1/ton differential between U.S. and Mexican sulfur (with the latter lower), consumers in a few areas are reportedly receiving supplies at an additional savings of \$1-1.50/ton.

Latest reports of an impending increase emanated from Houston, Tex., several days ago, and spread rapidly throughout the industry. Word was that official tags on Mexican sulfur would be the first to change upward. The imported material currently lists at \$24/ton (filtered) and \$23/ton (dark), f.o.b. Coatzacoalcas, Mex. [U.S. export schedules, in contrast: \$25/ton (bright); \$24/ton (dark), f.o.b. port.]

Talk of increasing prices has popped up occasionally since the general drastic drop of \$3/ton about a year ago (*CW Market Newsletter*, Sept. 28, '57). Observers say it's due to producers' "wishful thinking," since the cut put a severe crimp in sulfur sellers' profits.

Business has picked up some the past couple of months, but so far no U.S. or Mexican sulfur producer has dared make the first move toward higher tags. Reason: the competitive situation has been too sharp to trust that an increase would stick—that it would be followed by others in the industry.

But if a rise does come—and *CW* learns that one seller is on the verge of making a decision—it will be effective almost immediately.

**Another headache looms** for U.S., Mexican and other world sulfur marketers. About this time next year, a flood of French sulfur is expected to hit world markets. France, say reports, will have enough sulfur to sell to make it an important factor in the field. One compensating thought for concerned competitors: the reports also indicate that the French will eschew cut-rate pricing.

•  
**Toluene prices seem to have firmed considerably** at the 25¢/gal. mark established earlier this year when coal-tar and petroleum-derived materials both tumbled 4½¢/gal. Just about all customers east of the Rockies are paying the currently quoted schedule, with sellers picking up the freight tab.

## Market Newsletter

(Continued)

One exception, however, is the Chicago area. Some users there are reportedly getting a 1¢/gal. price break from a relative newcomer trying to get a foothold in the aromatics market.

**Big reason for the better tone of the toluene market** is tied to recent and unpublicized developments in the solvent-substitutes arena. Producers of water-white solvents are pulling out of the business because, says one, "it isn't profitable anymore." One such seller, until last month, was selling considerably more than 500,000 gal./month—and all of it vied for toluene and xylene outlets.

Toluene and xylene marketers' relief, however, may be short-lived. Indications are that a major coal-tar chemical producer will take over a great part of the substitute solvent market that toluene-xylene makers had hoped to garner.

**Price news continues to pop in nonferrous metal markets.** Lead, zinc and copper tags are all ½¢/lb. higher this week. For lead, it was the second such increase in a week, pegging the metal at 12¢ (New York). Chief reason for the lead upturns: sellers' inventories have been whittled by the recent business pickup.

Zinc's move to 10½¢/lb. (East St. Louis) was also inspired by several weeks of good buying, particularly during the last week or so. Fact is, both lead and zinc had been doing fairly well before the Oct. 1 imposition of quotas on imports of the two metals (*CW Market Newsletter*, Oct. 4).

The ½¢/lb. rise in custom-smelters' prices of copper (to 27¢) is, surprisingly, attributed to a tightening supply position. Strikes have closed major copper-producing facilities in Africa and in Canada, and scrap stocks are down. The new custom-smelter tag is ½¢/lb. above producers' prices, which have been in effect since mid-July, but there's a chance the latter may soon move upward. Producers' copper sales have improved steadily.

**U.S. urea capacity hikes 20,000 tons/year this week:** Hercules Powder's new Hercules, Calif., plant is in, commercially. Some 75% of the output will head for agricultural uses, the remainder to manufacture of urea-formaldehyde resins and to feed-grade urea. A new process, says the company, will make possible an "unusually high-quality urea."

### SELECTED PRICE CHANGES — WEEP ENDING OCTOBER 6, 1958

	Change	New Price
UP		
Ammonium nitrate, dom., fertilizer grade, 33.5% N, bags, fob, wks., ton	\$5.00	\$65.00
Aluminum chloride, coml., anhyd., dms., c.l., wks., frt. equald., lb.	0.005	0.16
Aqueous ammonia, 29.4%, tanks, wks. anhyd. basis, ton	4.00	87.00

All prices per pound, unless quantity stated.

# ATLANTIC REFINING CHEMICALS DIVISION OPENS WEST COAST SALES OFFICE



Catalytic Cracking Unit, Atreco Refinery, Port Arthur, Texas

## LOS ANGELES OFFICE TO SERVE PACIFIC COAST INDUSTRY

The opening of a new West Coast Sales Office has been announced by Charles E. Bonine, Manager of Atlantic's Chemicals Division. Located at 4814 Loma Vista Avenue, Los Angeles 58, California, this new branch office provides West Coast industry with direct sales and service.

In addition, warehousing facilities in Los Angeles, San Francisco and Portland assure prompt delivery of Atlantic Petrochemicals.

The addition of the Los Angeles Office now enables Atlantic's Chemicals Division to market on a direct basis throughout the United States. The Atlantic

Refining Company also markets in Canada, Belgium, Brazil and many other foreign countries.

Atlantic's first Petrochemical, a group of synthetic detergents marketed under the brand name of ULTRA-WET, was introduced in 1937. Atlantic ULTRAWETS, finding application in products ranging from household detergents to herbicides, are now generally considered to set the standards of performance and quality in their field. In addition to its synthetic detergents, Atlantic produces a family of quality products to meet growing industrial needs including Detergent Alkylate, Olefins, Anhydrous Ammonia and Technical Eicosane.

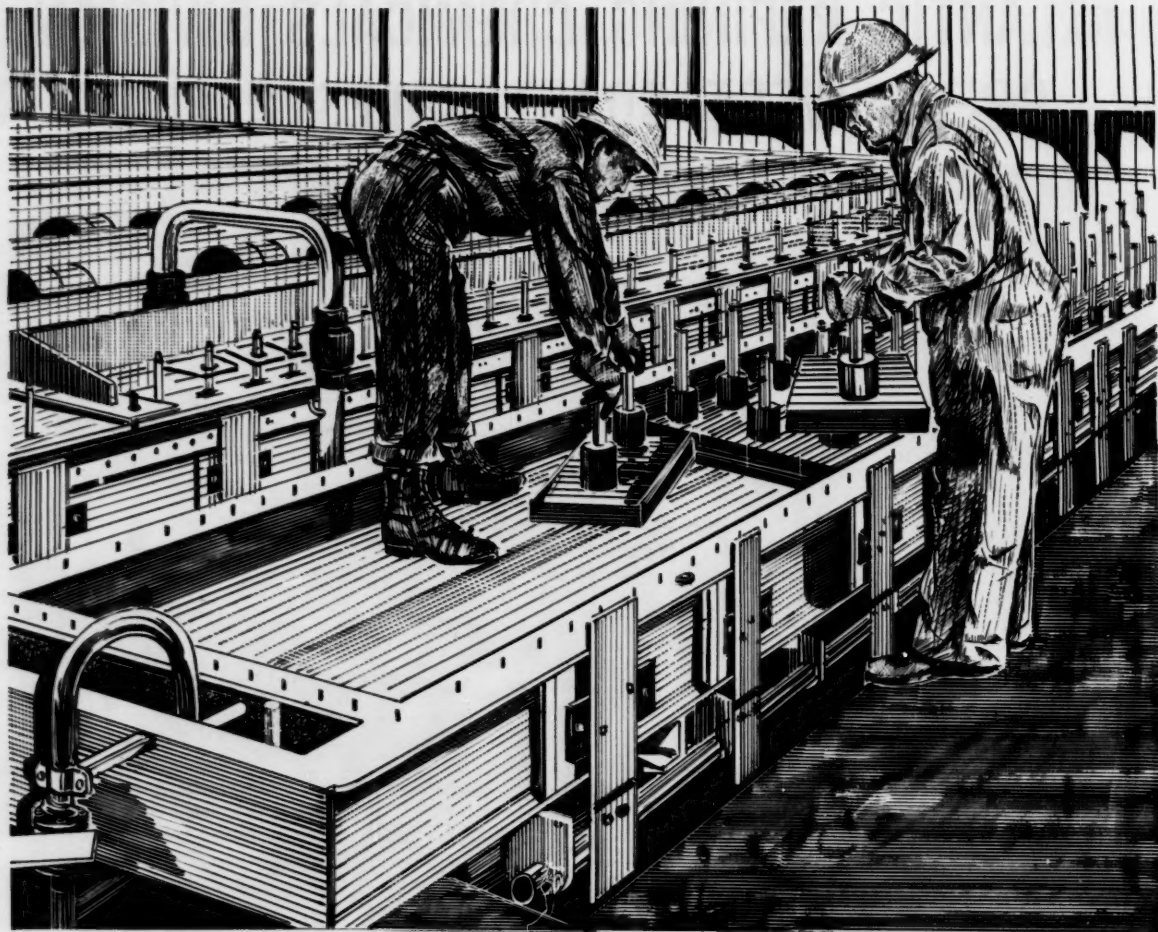


### W. E. SMITH TO HEAD WEST COAST SALES OFFICE

Wes Smith, the resident Sales Engineer, is a graduate of Rutgers University with a degree in Chemistry. Prior to joining Atlantic in 1952, Mr. Smith had nine years' experience in chemical research and sales engineering in chemical and textile industries. He has served with Atlantic as Sales Engineer covering the Southeastern States. Mr. Smith is thoroughly experienced in surfactant formulation, production and marketing.

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# MARKETS

## Hula Hoops Roll in a Polyethylene Bonanza

"Hoop spinning is easy, economical and just zany enough to have caught the fancy of Americans of all ages, but we don't really understand the basic appeal of the hula hoop. Sales-wise, we've never seen anything like it." That's the consensus of resin producers, toy manufacturers and retailers who share the profits of the fantastic new \$35-million fad that sprang up overnight.

Toy makers and supply-harassed resin producers are now taking time out to ask these pertinent questions about their new-found business: How long will the fad—and demand for hoops—last? Will popular appeal vanish as fast as it came, leaving warehouses and stores glutted with unwanted hoops? Are there any "angles" that will perpetuate the market?

**How Big Now?** Hoop whirling swept across the U.S. so fast that no one really knows—even now—just how big the business is. Most industry observers frankly admit their inability to do more than guess the size of the total market. Some say that total retail hoop sales so far are at some \$35 million—25-30 million hoops. Hoops cost \$2 to 60¢ each; average is about \$1.

More down to earth—although only a partial picture—is a report from one major resin supplier who says his firm sold 4 million lbs. of linear-type polyethylene, in eight weeks, to hoop makers.

**Linear Poly Tops Sales:** Right now an estimated 80% of all hoops are made of linear polyethylene. Other plastics—impact polystyrene, regular polyethylene, acetate and butyrate—had a larger share until a few weeks ago because of a shortage of the linear polyethylene. Linear polyethylene got its start toward the top-volume rating when Grace Chemical spotted a good thing in the modest-scale field-testing of plastic hoops, four or five months ago, by Wham-O Manufacturing Co., a California producer of novelties. Almost immediately Grace's technical service men were out in the field showing extruders how to make the tubing from linear polyethylene.

Aside from the hefty profits being made in the hoop business, the fad has given producers of linear poly-



Youngsters' fad for hoops is strong now, but how long will it last?

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Chemical Week • October 11, 1958

## MARKETS

ethylene an unusual opportunity to introduce the resin to extruders. And this may well turn out to be the major factor in the successful marketing of linear polyethylene, which, up to now, hadn't been moving very fast.

Other suppliers of linear polyethylene were, of course, quick to grab a share of the new market. But right now, most of the linear poly that ends up in hoops is supplied by Grace and Celanese.

The sudden rush for resin raised havoc with normal delivery schedules, and it's quite likely that in many cases supplies tabbed for other applications were side-tracked into the hoop factories (including basements, garages—in fact, any corner where the tubes could be extruded and stapled into hoops). Resin producers' stocks of polyethylene, it's reported, were cleaned out in short order—which gave suppliers of other types of plastics a temporary, though relatively small, crack at the market.

Uncertainty about the actual number of hoops made and sold is compounded by other factors that make accurate estimates of the market value virtually impossible. For example, many hoops reportedly consist of regular polyethylene blended with linear polyethylene—but the percentage of each component may vary widely from one extruder to another.

**Black Market?** Reports persist that a sizable black market for resin flourished during the peak rush for raw materials. But these reports have not been confirmed, although resin suppliers say that "premium prices" were sometimes paid, somewhere along the line, for fast delivery. Other resin makers scoff at reports of a black market—as far as resin is concerned—say the finished product was much more subject to such dealings.

**More Gimmicks—More Sales?** The sudden wealth that the hoop fancy whirled into laps of resin producers and toy fabricators has posed a provocative question: Will someone come up with a new, equally bright idea, when the hoop twirling begins to wane?

Right now, there are only vague hints that new ideas are being hatched by toymakers. Consensus seems to be that a worthy successor to the highly profitable hoop is still only a collective hope of the toy and plastic industries. Chances are, some experts



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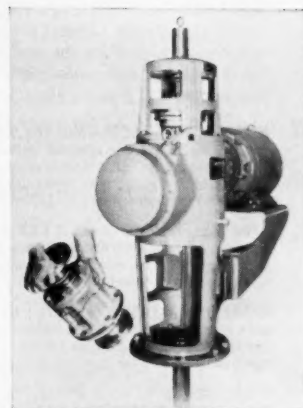
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## MARKETS

say, that only run-of-the-mill toy products will be forthcoming, that miracles don't happen every day.

As for the hoop itself, considerable thought is being given to the problem of maintaining its popularity at high level for a long time. Latest effort is aluminum hoops, which missed the peak of the buying rush; they are apparently aimed at twirlers seeking long-lasting hoops.

But it looks right now as though plastics will continue to hold the major part of the hoop market. To this end, manufacturers are devising various innovations such as multicolored products, various sizes, expandable types, and "semimusical" models. For the faddist to whom price is no object, there is available a mink-covered hoop—at \$100 plus tax. Nonentertainment uses are also being explored. One example: petticoat stiffeners.

**Replacement Market:** One important aspect of the long-range hoop market is replacement. It's too early, say industry spokesmen, to say whether the nation's unpredictable youngsters will demand new hoops when their old ones wear out. "Give us another month," they add, "and we will begin to get the answer."

In any case, consensus is that there will continue to be a substantial demand for hoops. "Look at how the voyo has lasted," say hopeful proponents.

Meanwhile, fly-by-night hoop makers will drop out of the picture—most of them have probably already dropped out or are about to—leaving the job to established toy manufacturers who have put this item into their permanent lines.

**Another Ringer in Canada?** The hoop infatuation has rolled a long way. From Australia, where it apparently started, it island-hopped across the Pacific to California. Encouraged by plastics producers and toy makers, it began rolling eastward last June. By late July, it had whirled into Chicago, shortly thereafter hit New York full force, then swerved northward through New England, and up into Canada.

For a while, it looked as if the relatively staid Canadians might shun this hin-swinoing form of entertainment, but the *Toronto Gazette* reports the invasion has reached Montreal and is capturing the fancy of Canadians.

**Motivation Lesson?** Resin makers,

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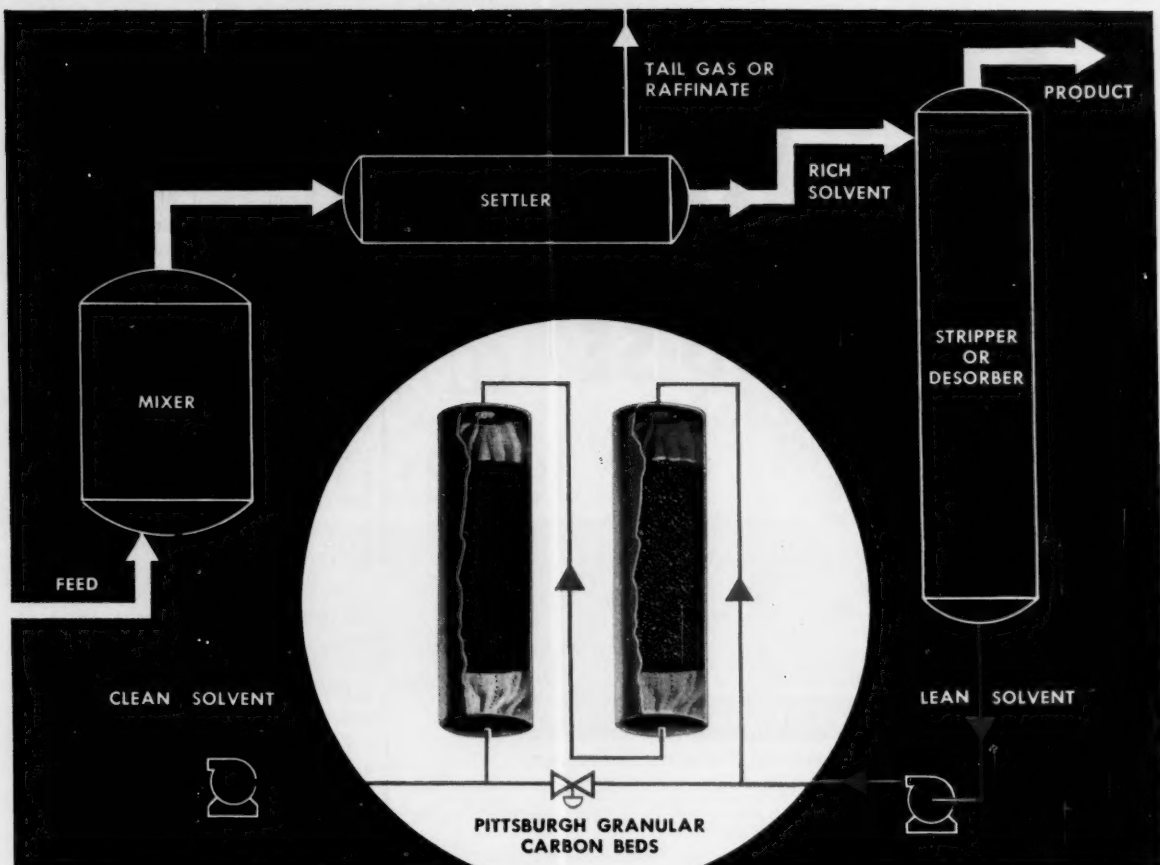
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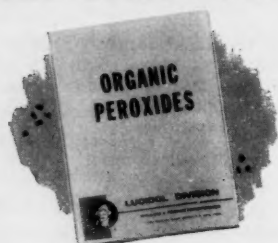


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## MARKETS

seeking continued markets in toy making, say the apparently unflinching lure of the hoop underscores the need for depth probing of buyer motivations. Any analysis of what propelled the hoop business must, of course, include the tremendous amount of free publicity that hoop marketers unwittingly stirred up. Almost any situation—real or contrived—that involves a hoop is likely to make the front pages of the newspapers.

While most resin manufacturers prefer to stake the major part of their businesses on more predictable, if less spectacular, items, there's no denying that all would welcome repeat performances of the hoop craze.

## Canadian Gas Startup

**British American Oil's \$25-million gas processing and sulfur plant at Pincher Creek, Alta., will begin regular delivery of processed gas Nov. 1, under a 25-year contract with Trans-Canada Pipe Line.**

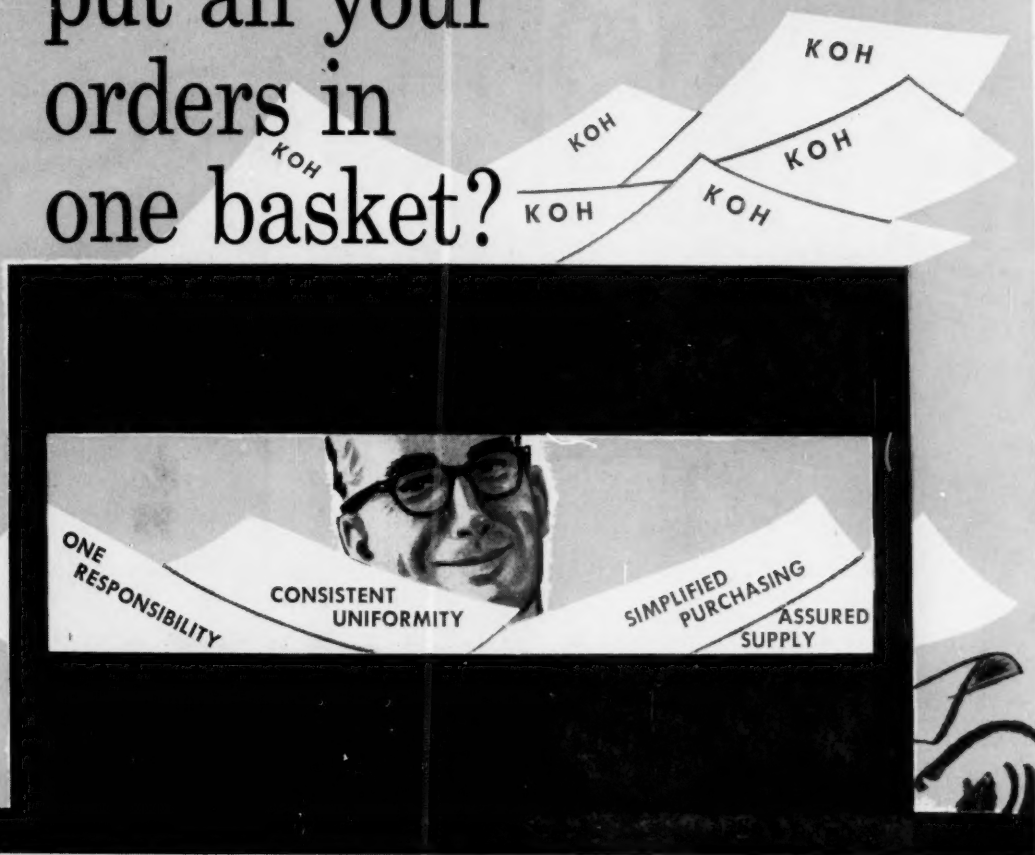
Gas began flowing to the Alberta gas trunk line late last month (for line fill and testing) in the first of a series of steps slated to tie the Pincher Creek field to Eastern markets. The field will be the largest single supplier to Trans-Canada, will pump out an estimated 70 million cu.ft./day during the first year. Gas from Pincher Creek field will be delivered to Trans-Canada at the Alberta-Saskatchewan border through the Alberta gas trunk line.

First delivery to trunk line was made upon completion of British American's stage-two plant, which has been under construction since early '57.

In addition to processed gas for Trans-Canada, the stage-two plant will produce "large quantities" of sulfur, condensate, propane and butane. All of these, says British American, "are calculated to encourage the development of secondary industries in western Canada."

That Alberta was pegged for an impressive industrial expansion was underscored recently by Calgary Power, Ltd. (*CW Market Newsletter*, June 7). Calgary predicts that value of the entire Alberta industry group will have hit \$370 million by '75, including \$300 million in petroleum refining; \$20 million, natural gasoline and hydrocarbons; \$40 million, sulfur; \$10 million in coal products.

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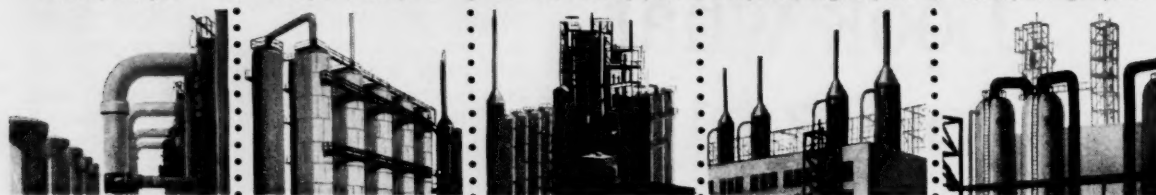
Ironton, Ohio plant

Southpoint, Ohio plant

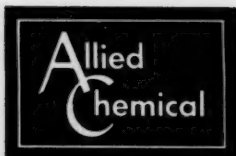
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# SPECIALTIES

## Taste Makers Ready for Law Makers' Tests

The next few months will be critical ones for flavor makers, who are now faced with problems stemming from the recent amendment to the Federal Food, Drug & Cosmetic Act of '38. The new Public Law 85-929—a tough piece of regulatory legislation — will require flavor makers to obtain approval to market new flavor products or those previously untested for safety.

Just how many chemicals will be subject to safety tests isn't known yet. A good guess, say flavor makers, is that 75-100 of the 600-1,000 synthetic organics that go into flavors are in for plenty of testing. The majority of 50 or so flavors most commonly used will probably escape the ordeal; Food & Drug Administration is now working up a list of exempt flavoring chemicals that are generally recognized

by experts as safe for consumer use.

Flavor sellers do a big business. They probably ring up \$130 million/-year in bulk sales to food and candy processors, drugmakers, tobacco and beverage companies, and about \$50 million/year in retail household items.

**Pie Has Many Slices:** The \$180/-million year business is divided among hundreds of companies, many of them selling less than \$1 million/year worth of flavors. The largest company in the business probably doesn't tally over \$20 million/year in flavor sales.

There are upwards of 5,000 different flavoring compounds. Many of these, although important flavors for a specific industry, barely carry their weight in the over-all sales picture. Unusual flavors, such as imitation passion fruit or imitation watermelon,

don't account for \$10,000/year in sales.

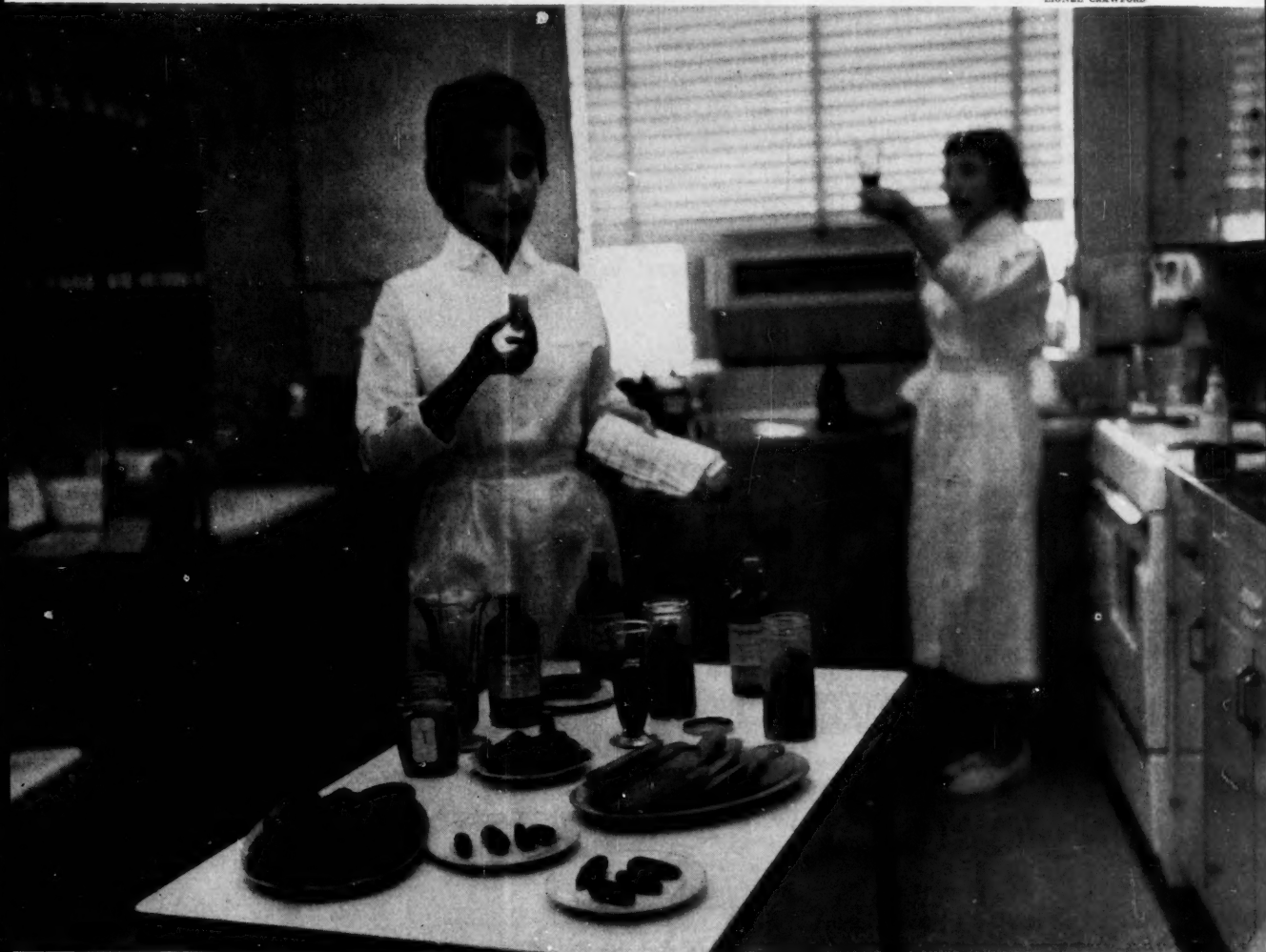
This raises a problem. If the tests required to pass such a small-selling flavor cost \$100,000, is it worthwhile to spend the money? And if it's worth it, who'll finance it?

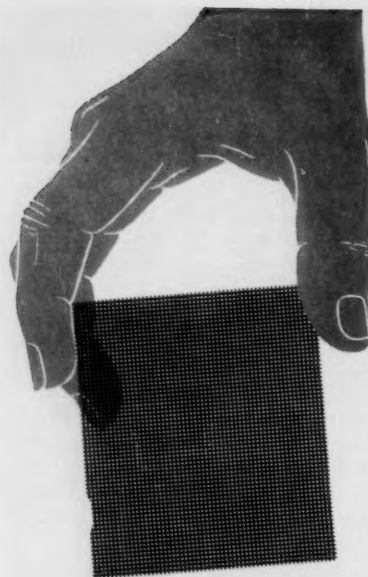
One solution, supported by most flavor makers, is this: every chemical to be tested would be an industry problem, not just a one-company affair. Each company making the chemical would contribute cash proportional to its sales.

But that solution has its problems, too. First of all, flavor makers, a tight-lipped group, don't want their competitors to know how much of a particular flavor they're selling. Second, every petition filed with FDA is public; it's published in the *Federal*

**Fritzsche technicians compare quality of natural with imitation flavors in the company's New York labs.**

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## SPECIALTIES

*Register.* If FDA okays the safety data, a New Food Regulation is issued publicly. Then any company can start manufacturing the chemical and, with a little compounding, put the flavor on the market—even though it didn't contribute a dime toward testing costs. To ensure protection, one flavor maker feels that something like an American Medical Assn. seal of approval would have to be issued to those companies that contributed to testing costs.

Still another problem is especially serious to flavor makers: trade secrets. Making flavors is a business that is still regarded as much an art as a science. Under the new food law, each company will have to reveal the flavors it makes, their end-uses, and their composition.

Biggest share of flavor testing costs will, of course, be shouldered by companies doing the biggest flavor business—those that manufacture a large number of aromatic flavor chemicals.

Of some 100 flavor manufacturers, only about six do 80% of the flavor business.

**Who's Who:** Fritzsche Brothers, Inc. (it also owns Dodge & Olcott, Inc.), is probably largest in the flavor business. Givaudan Flavors, Inc. (division of Givaudan Corp.), van Ameringen-Haebler, Polak & Schwarz, Norda Essential Oil and Chemical Co. (Norda also owns Dreyer, Inc., and Orbis Corp.) all give Fritzsche tough competition. All these companies are in New York. Among the other flavor companies are: H. Kohnstamm and Co., Firmenich and Cie, Syntomatic Corp., Rhodia, Inc., Magnus, Mabee & Reynard, Inc., Florasynth Laboratories, Felton Chemical Co., Geo. Lueders & Co., Ungerer and Co. and S. B. Penick (all New York), and Neumann-Buslee & Wolfe, Inc. (Chicago), Warner Jenkinson Mfg. Co. (St. Louis), Polak's Frutal Works, Inc. (Middletown, New York), and the Fries companies



## New Gun Speeds Epoxy Spraying

**Spray-coating with epoxies**, slowed because of the short pot-life of fast-curing, catalyzed systems, is said to be much simpler with Bakelite Co.'s specially designed spray gun (*above*), shown at this week's Paint Industries Show. The new gun combines the epoxy resins and hardener only an instant before the mixture is atomized and sprayed.

A metering system feeds correct

proportions of resins and hardener to a mixing chamber. Pressure of 300 psi. drives the mixture through an orifice. Spray is created by pressure of the liquids, not by compressed air; thus, overspray and misting are sharply reduced. The spray gun (which is self-cleaning) and its metering equipment were designed and are manufactured by A. Gusmer, Inc. (Woodbridge, N.J.).



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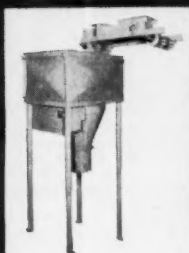
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McGraw-Hill Publishing Company, Inc.  
By John J. Cooke, Secretary  
Sworn to and subscribed before me this 8th day of  
September, 1958.  
[SEAL]

JANET A. HARTWICK  
(My commission expires March 30, 1959)

### SPECIALTIES

—Fries and Fries, Inc. (Cincinnati),  
and Alex Fries Brothers, Inc. (New  
York).

Although most flavor houses manufacture some aromatic flavor chemicals, they by no means make all the aromatics used in flavor compounding. Trubek Labs., Inc. (Rutherford, N. J.), is the biggest aromatic chemical supplier in the flavor business. Among the flavor houses, van Ameringen-Haebler, Givaudan, and Norda probably do the most aromatic manufacturing.

All citrus oils sold by flavor houses are bought from the citrus oil companies. Among the largest companies in this end of the business are California Fruit Growers Exchange (Sun-kist brand) and Bireley Inc., division of General Foods (Hollywood, Calif.). Main producers of spearmint and peppermint oil are C. F. Ten-Eyeck (Burbank, Calif.); S. Todd Co. (Kalamazoo, Mich.) and William Le-man (Bremen, Ind.).

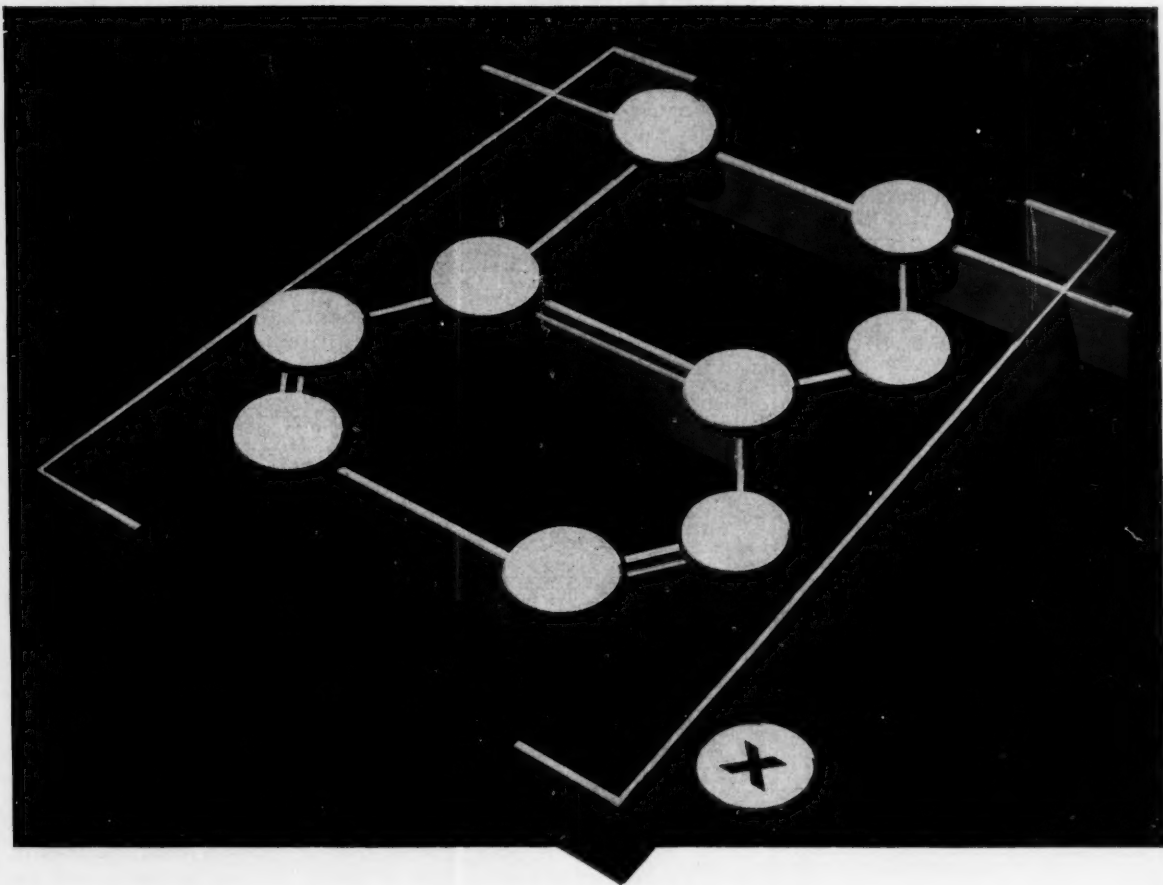
No flavor maker manufactures a complete line. They all fill out their lines by buying certain flavors from other houses.

**Natural Leader:** Natural flavors account for at least two-thirds of the estimated \$180 million worth of flavors sold. The citrus and mint oils and natural vanilla probably account for the bulk. Sales of imitation, synthetic or artificial flavors—there is no legal distinction between these words—probably hit \$43 million last year, although no one is quite sure. Of that amount, 12-15% were spray-dried flavors, about 5% was imitation vanilla (vanillin). On the whole, the imitations are cheaper, more concentrated, show higher heat resistance and oxidize less easily than the naturals.

Accurate breakdown of flavor end-uses is hard to come by because flavor houses don't keep close tabs on ultimate destination. An approximation: 80% for food products; 20% for medicinals, tobacco and other products (ranging from dog food to mouth wash).

Flavor houses sell through two main outlets. Bulk of the materials is sold direct to large food, tobacco and drug companies. The remainder goes to extract houses, which, for the most part, are small, local companies that reformulate or simply repackage and dilute flavor concentrates. Extract





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## SPECIALTIES

houses, in turn, sell their products to smaller food processors, soda fountain operators, or to other companies that use flavoring agents. Most extract houses specialize in servicing one particular industry, such as the ice cream business or the "soda pop" bottlers. There are few jobbers in the flavor field; most of them supply bakers.

**Number One:** Most popular single flavor is vanilla (both natural and imitation). According to Vanilla Bean Assn., imports in the past 10 years have averaged 1.4 million lbs./year. Last year's bean market (manufacturers' level) was around \$15 million. Biggest vanilla outlets are ice cream, chocolate products and household extracts.

Fewer vanillin than vanilla dollars are rung up annually, but it doesn't take as much vanillin to obtain the same flavor strength. Ten ounces of vanillin have the flavoring strength of 1 gal. of a 10-fold vanilla extract.\* Vanillin is cheaper than pure vanilla, too—current price of lignin vanillin is \$3.25 lb. Last year, about 1.5 million lbs. of lignin vanillin were sold—around \$5 million worth. Almost all vanillin used today is made from lignin. Suppliers are Monsanto, Salvo Chemical (division of Sterling Drug, Inc.) and Ontario Paper Co. Ltd. (Thorold, Ont.). All these companies market directly, and through flavor houses and other distributors. About 80% of all vanillin is used in foods, 10% as an intermediate in pharmaceutical and other manufacturing, 5% in medicinals and 5% in soaps, etc.

Here's a rundown of the more important flavors and their end-uses.

**'Pop' Flavors:** Biggest users of flavors are soda pop makers. Last year, Americans spent over \$1.35 billion for 2 billion gal. of soda pop — about 189.2 bottles per capita. About 80% of all flavors used in pop are natural.

Here's the percentage breakdown:

Cola extracts account for 64% of all flavors, followed by lemon, lime and lemon-lime combinations, 9%; orange, 6%; root beer and sarsaparilla (mostly root beer), 4%; ginger ale, 4%; grape, 2%; all others (a wide variety with no single flavor reaching 1% of national total), 11%.

Most of the large pop makers (Coca

\* One gallon of a 10-fold vanilla extract contains the extractable matter from 133 oz. of vanilla beans.

Cola, Pepsi Cola, Hires, Canada Dry, Nehi, etc.) manufacture their own flavor extracts or have them produced on contract by extract houses. The industry's independent bottlers—accounting for less than 10% of total sales—usually buy flavors from extract or flavor houses. From 70-75% of all flavors used by the pop people are made by franchised soft-drink companies, either directly or through contracts with other extract houses.

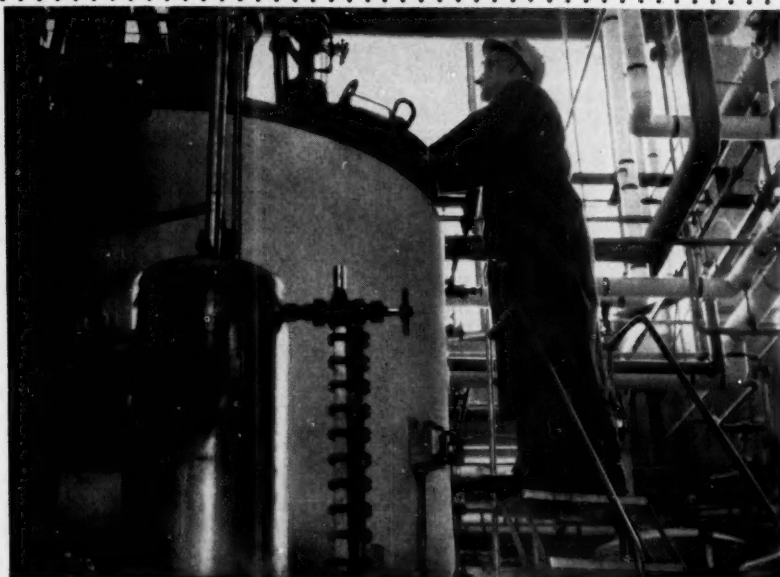
**Candy:** Candy makers probably rate second after the pop makers; they are the biggest buyers of imitation flavors. Most popular candy flavors are citrus oils, vanilla (both natural and imitation), oil of peppermint among the naturals, and the fruit flavors—cherry, strawberry and raspberry leading—among the imitations.

In the bakery field (includes icings, fillings, baked goods), vanilla and vanillin are again the most popular, with lemon oil coming in a pale second. Imitation butter and almond extracts are important bakery flavors, too.

**Ice Cream:** Close to 80% of ice cream sold is vanilla. Chocolate is second, with strawberry a far-away third. Bulk of ice cream flavors are natural (although small quantities of vanillin are used to fortify some vanilla ice cream).

**Gum and Toothpastes:** Peppermint, wintergreen and spearmint rack up their biggest sales in the toothpaste market. Toothpaste companies buy about 1.5 million lbs. of flavoring yearly. Chewing-gum makers buy close to 1.6 million lbs. Here's the breakdown in the gum business: 50% peppermint, 25% spearmint (chewing gum uses 50% of all spearmint) and 25% clove, cinnamon, fruit flavors, wintergreen (largely bubble gum), licorice, teaberry and other flavors. According to Dow, biggest users of methyl salicylate (imitation wintergreen) are the gum and toothpaste makers. Monsanto, Heyden Newport and Dow are leading suppliers of methyl salicylate, about a \$2-million/year market.

**Sweet Pills:** Fastest-growing outlet for flavor people is the pharmaceutical field—particularly the big ethical makers. Big reason for this is that drugmakers compound about 90% of the products the pharmacists sell. Most of the flavors going into drug products are tailor-made, with no particular flavor having a strong lead.



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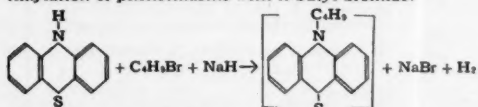
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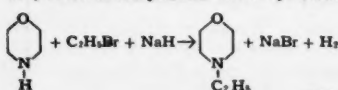
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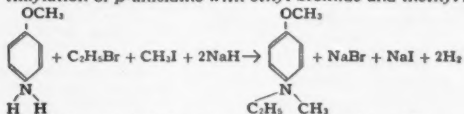
*Alkylation of phenothiazine with n-butyl bromide:*



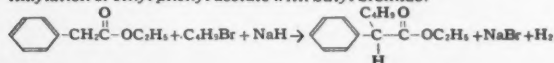
*Alkylation of Morpholine with ethyl bromide:*



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## SPECIALTIES

Tobacco and liquor companies are big users of flavors, too, but they won't say how much they use. In the tobacco field, pipe tobacco is the most important outlet, although filter cigarettes are moving up in flavor consumption.

Most popular tobacco flavors are the fruits (apple, apricot, peach), vanilla and vanillin, rum, prune and nut flavors. Flavors that taste like tobacco are seldom used.

In the liquor field, cordial makers are the biggest users, and it's a growing market. High concentrations of flavors are used—one bottle of cordial may contain up to 2.5% flavoring.

**The Dries:** Biggest development in recent years has been the fast growth of spray-dried flavors (*CW*, Aug. 3, '57, p. 78). Aside from the citrus oils and spices, almost all spray-dried flavors are imitation. Biggest reason: the naturals are fairly volatile at temperatures needed for spray-drying. Flavor makers estimate that upward of 3 million lbs./year of spray-dried flavors are now being produced. At least 11 flavor houses have spray-drying units. Capacity of a unit is about 400 lbs./hour.

Biggest outlet for the dries is the \$170-million cake-mix industry. Runners-up are the \$75.1-million packaged gelatin dessert industry and the \$30-million powdered soft-drink industry.

Pharmaceutical houses are also important users of dried flavors. Although not yet big buyers of the dries, candy makers are now beginning to turn to them.

Another big flavor market is household extracts. Last year, retail sales of vanilla (almost all natural) was close to \$30 million. Another \$20 million was spent on other flavors such as lemon, orange, the mints, fruit and nut flavors. A 4-oz. bottle of vanilla extract contains about 4% solids, the rest being alcohol, water or other solvents. Lemon and orange extracts usually contain 5% citrus oils. Biggest company in the household extract field is McCormick & Co., Inc. (Baltimore, Md.).

Growth prospects in the flavor business look good. For the past five years, flavor sales have gone up 5% annually. With convenience foods on the upsurge, pop, drug and tobacco products hitting record highs, there's only one way for the flavor business to go.

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Hardinge #XA-18 double shell dryer, 8'6" x 70", 1/2" thick shells. Perry Equipment Corporation, 1415 N. Sixth St., Philadelphia 22, Pa.

For Sale—8 drs. Clear Vinyl Lacquer \$1.00/gal.; 20 drs. Maroon Bass Lacquer 50¢/ga.; 8 drs. each 65% Solids Iron Blue, Bright Red, Hansa Yellow Vinyl Pastes 15¢/lb. Chemsol, Inc., 74 Dod St., Elizabeth 3, N.J., FLanders 1-2020.

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Mfg'ers Reps calling on Industrial Jobbers wanted to represent eastern mfg'r of stainless steel screwed pipe fittings. Sales commission. Choice territories avail. Advise of current lines. RW-9050, Chemical Week.

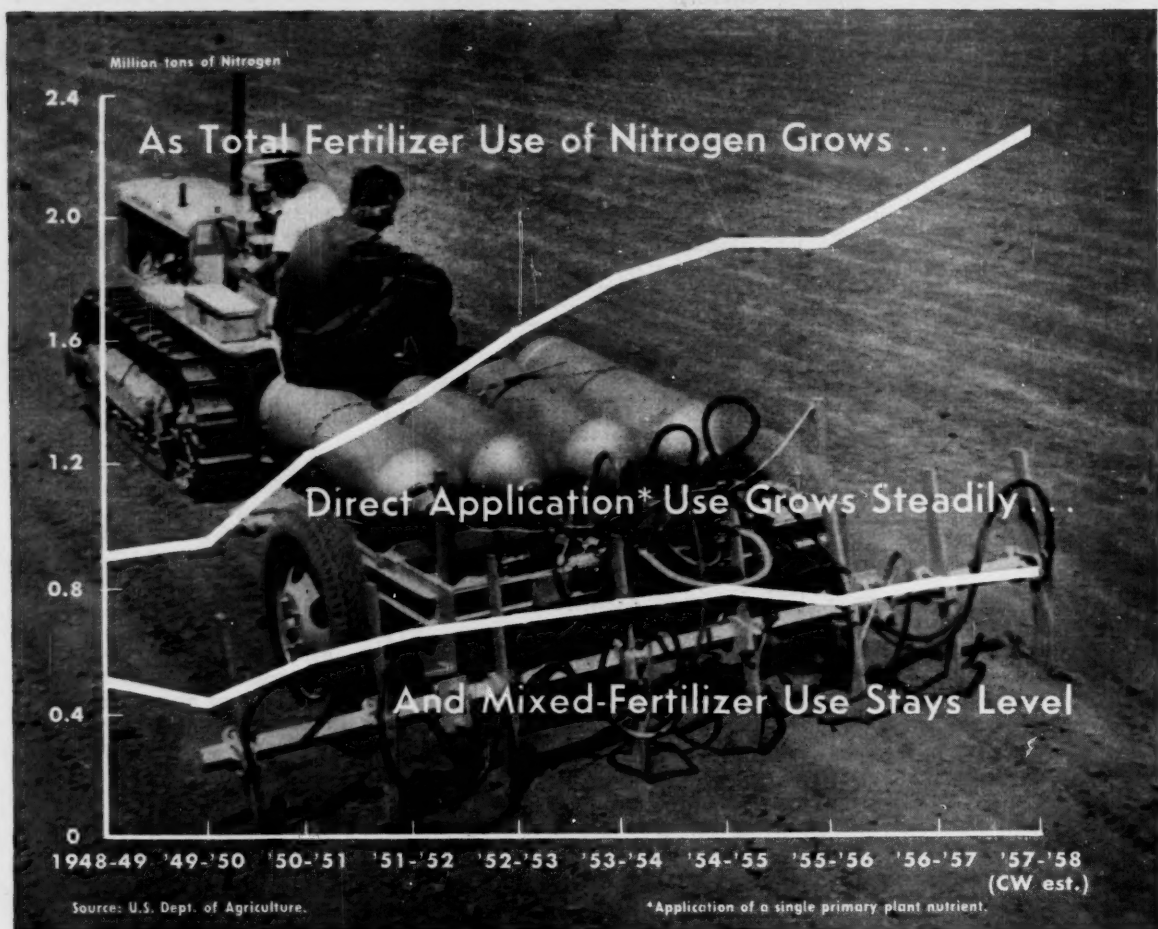
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Technical Sales or Service-Graduate chemist with 10 years experience in sales development and service desires direct chemical or industrial sales position. Successful experience in sales development of textile chemicals and yarns. PW-9041, Chemical Week.

Electro-Plating Engineer. Graduate chemist, age 44; 22 years diversified experience, extensive background in all phases of metal finishing surface treatments and corrosion problems. Equipment design process control research and development. Seeks responsible position Metropolitan New York City area. PW-9062, Chemical Week.

# CHARTING BUSINESS

October 11, 1958




## Direct Gain for Nitrogen Producers

At the close of the '57-'58 agricultural year, direct-application fertilizer will take an estimated 1.4 million tons of available nitrogen—a 62% slice of the 2.25 million tons of available nitrogen used for fertilizer during this period. Just 10 years ago, available nitrogen, directly applied, amounted to about 388,000 tons, 43% of the total 980,000 tons of nitrogen used by the fertilizer industry. Within a decade, direct-application nitrogen tonnage has jumped 260%. Use of nitrogen in mixed fertilizers has also increased, but not as spectacularly. About 850,000 tons of avail-


able nitrogen was used in mixtures during the past fertilizer year, compared with 512,000 tons in '48-'49.

Reason for trend to direct application:

- A higher concentration of available nitrogen is obtained in direct-application materials, compared with mixtures.
- Increased use of fertilizer during growth season of crop. Mixtures are applied during preplanting season.
- Nitrogen is obtained at a cheaper unit rate in direct-application fertilizers.



**R.C.I.** has a resin emulsion to solve your problem



**REICHHOLD** offers an extremely diversified line of resin emulsions. Furthermore, RCI has the production flexibility to tailor an emulsion that will solve a specific problem in your application. On standard emulsion materials, you can always count on RCI for complete end-use data and helpful advice from a technical service staff with wide experience in this area.

**SURFACE COATINGS** — RCI offers vinyl acetate polymers and copolymers. For example, WALLPOL 9304 has fine particle size, is borax-stable. Offers high performance with maximum economy in interior and exterior paints. WALLPOL 9120 is highly distensible, has fine particle size, and is borax-stable. Offers premium performance coatings at reasonable cost. For floor paints, RCI recommends a combination of ACRIPOL 9425 acrylic emulsion and SYNTHMUL 1505 alkyd emulsion. The latter is also highly suitable for the formulation of architectural gloss and semi-gloss enamels with the advantage of water clean-up. SYNTHMUL 1506 is a vehicle for non-flammable industrial metal primers and finishes. RCI P-822 BECKOSOL is an emulsifiable alkyd for special coating applications. RCI P-719 BECKOSOL is an oleoresin additive for emulsion coatings incorporating protein binders.

**FLOOR POLISHES** — RCI acrylic ester copolymers, ACRIPOL 9425 and 9430, are emulsions designed for the formulation of floor polishes with excellent gloss and jetness on porous surfaces, freedom from dusting or yellowing. As companion materials for the ACRIPOL emul-

sions, RCI offers the floor polish manufacturer 1550 and 1551 WATEREZ, hard ammonia-soluble resins which give optimum hardness and abrasion resistance to ACRIPOL floor polishes.

**TEXTILES** — Two RCI vinyl acetate polymers are useful to the textile industry. PLYAMUL 9350 LV lends itself to the formulation of semi-permanent finishes (non-chlorine-retentive and non-yellowing) that impart crisp, firm hand to fabrics; while PLYAMUL 9370 finds application as a binder for non-woven fabrics. SYNTHMULS 1530 and 1535 are emulsifiable alkyds with excellent adhesive and pigment binding properties, especially developed for the water-in-oil pigment printing of textiles.

**PAPER COATINGS** — RCI WALLPOL vinyl acetate polymers and copolymers have excellent properties for production of clear paper coatings where greaseproof and waterproof characteristics are desired. RCI ACRIPOL acrylic ester copolymers can be tailored to serve well as binders for pigmented and metallic finishes on paper. RCI SYNTHMUL alkyd emulsions also find application in paper coating.

**ADHESIVES** — The RCI line of vinyl acetate polymers may be used alone or with plasticizers, starches, dextrans and fillers. PLYAMULS 9350 LV and HV, 9360 and 9370 are offered for professional compounding of adhesives with a wide range of end uses. PLYAMUL 9153 is a general purpose adhesive for many varied applications. In woodworking, it permits quick setting with minimum clamping requirements and gives exceptional bond strength. RCI P-721 BECKOSOL is a non-toxic polymeric plasticizer for vinyl adhesive emulsions.

**CEMENT ADDITIVE** — Cement manufacturers should investigate the unique properties of RCI PLYAMUL 9155. Added to cement, this modified PVAc emulsion improves bond to old masonry and to steel; permits featheredging on concrete patches; improves toughness and resilience; minimizes need for damp curing and improves tensile and compressive strength.

Write Reichhold for full details on the RCI Resin Emulsions which may be suited to your production.

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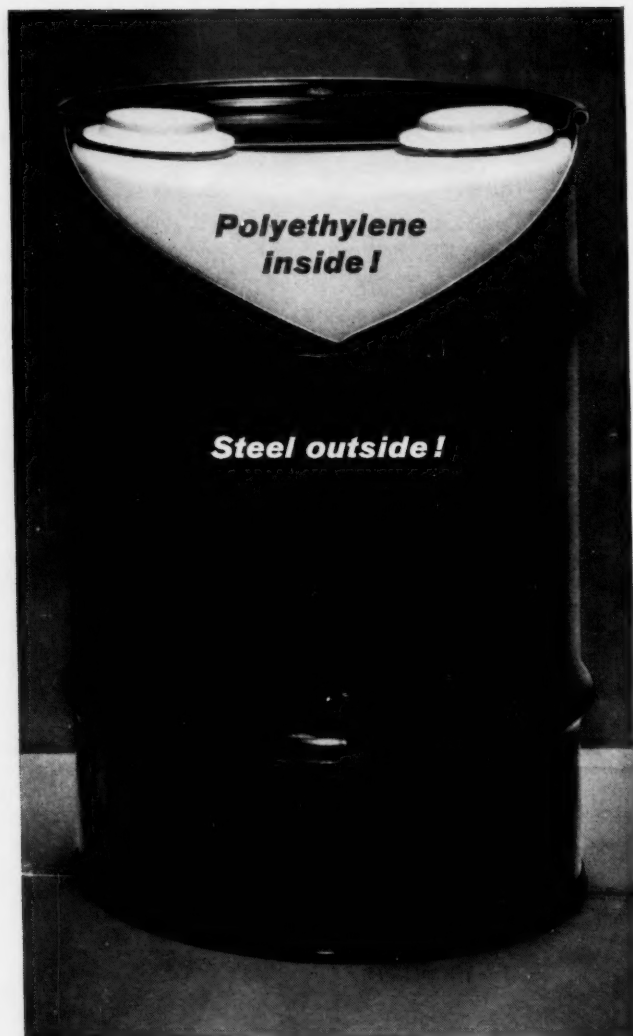
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## AQUEOUS HF IN NEW, SAFER "DRUM-WITHIN-A-DRUM"



Development of a safer container for Aqueous Hydrofluoric Acid (70% HF) has long been an important objective of chemical packaging specialists. Now General Chemical offers Aqueous HF in a new, safer "drum-within-a-drum" which combines the advantages of polyethylene and steel. Developed after more than two years of testing, this drum offers many important features:

**Requires no venting!** The new drum entirely eliminates venting, since there is no acid-to-steel contact. The all-steel drum presents possibility of danger from hydrogen pressure unless venting is done frequently and regularly.

**No corrosion or leakage!** One-piece polyethylene construction of inner drum cannot corrode or leak even during long periods of storage. The HF-resistant "poly" drum is fixed firmly inside its steel overpack.

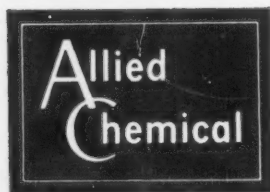
**Polyethylene closure seals tightly without "freezing"!** Both bung opening and plug are acid-resistant polyethylene. The specially-constructed closure is exceptionally tight, yet simple to operate... eliminates "frozen" closures.

**Lower tare weight!** The new drum is much lighter than the all-steel container. The 30-gallon size, for example, carries 260 pounds of 70% HF with tare weight of only 40 pounds.

General Chemical is the nation's leading producer of hydrofluoric acid. Producing Works are located at Baton Rouge, La.; North Claymont, Del.; and Nitro, W. Va. Additional packaging locations at Buffalo, Chicago, Cleveland, Pittsburgh, and El Segundo (Calif.)

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